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"I THANK YOU—
I thank you ever so much—but I couldn't even think about smoking a cigarette."

"WELL, I UNDERSTAND,
but they are so mild and taste so good that I thought you might not mind trying one while we are riding along out here."

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INDICATIONS FOR OPERATIVE INTERFERENCE IN MIDDLE EAR SUPPURATION*

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SUPPURATIVE disease of the middle ear is so common, especially among children, that we are prone to forget the serious possibilities inherent in every discharging ear. Reliable statistics gathered by Koerner, substantiated by Bezold, showed that four-tenths of one per cent of all deaths occurring under the age of thirty in Prussia were due to ear diseases. Statistics for our own country, were they available, would disclose even a higher death rate.

With a better knowledge of the anatomy and pathology of the temporal bone, improved methods of diagnosis and surgical technic, and, above all, with a clearer understanding of the indications for operative interference, now well defined, the modern otologist when he encounters a fatal case of suppurative otogenous disease is reluctantly obliged to pronounce to himself the sad and silent verdict: "This patient should have lived." In other words, under modern care deaths from the complications of middle ear inflammation are largely preventable.

This presentation has been stimulated chiefly by a recent study of the cases coming to operation in the ear clinic of the University Hospital during the past three years. Time does not permit case reports nor any statistical analysis. For our present purpose it is sufficient to state, without any criticism or apology, and in spite of many notable recoveries when complications were present, that the mortality has been unfortunately too high. A very extenuating circumstance is found in the fact that often the general practitioner and pediatrist who attended these patients first were not themselves consulted until complications had already occurred. Many of these patients were admitted in a critical condition.

The first object of operative interference in a case of middle ear suppuration is to save life by removing the possibility of a serious complication; the second object is to conserve the hearing.

One of the most perplexing questions confronting the physician since the beginnings of otology has been, "What are the definite indications for operation?" In the following paragraphs we shall attempt to briefly summarize what is the best otologic opinion on this very important subject. There is not time to refer to individual authors.

The first fundamental principle in dealing with middle ear inflammation is that with every severe infection of the middle ear there occurs more or less involvement of the adjacent structures, *i.e.*, the antrum and neighboring mastoid cells or bone. A second recognized fact is that the symptoms, course, outcome and indications for operative interference in any case of purulent otitis media are largely determined by three factors: (1) the type and virulence of the invading organism; (2) the resistance of the patient; (3) the anatomical structure of the invaded temporal bone.

1. Under the first head it should be recalled that there is great variation in the virulence of the invading germ at different seasons and in different epidemics. Of the different organisms producing otitis media, the streptococcus hemolyticus and the streptococcus mucosus are the ones most prone to cause complications, the former through early involvement of the blood stream, the latter, because of its characteristic to insidiously and progressively destroy the bony

*Read before the Southern Minnesota Medical Association, New Ulm, Minn., Sept. 26, 1933.

structures, with an excessively high mortality from complications.

2. The resistance of the patient is adversely affected by infancy and the existence of preceding or concomitant debilitating diseases, notably the exanthemata, influenza, diabetes, tuberculosis and others.

3. The anatomical structure of the temporal bone largely determines the likelihood of its serious invasion, the question of spontaneous recovery, the tendency to complications and the presence or absence of the usual external signs of extension to the mastoid.

The temporal bone of the infant differs from that of the adult in ways wherein it is more susceptible to bacterial invasion. The auditory (eustachian tube) is shorter, more patent and more nearly horizontal. The bone itself presents defects as dehiscences and ununited sutures, affording pathways for deeper infection. The lining membrane of the tympanic cavity is soft, of low resistance and in certain areas is not firmly attached to the bone, which it poorly protects. It is a matter often overlooked that the infant temporal bone, while showing no development of a mastoid process, may, nevertheless, become invaded from the middle ear and undergo extensive destruction.

The degree of pneumatization of the temporal bone is of the greatest importance. The large celled type is best able to take care of itself, and invasion in such a temporal bone often undergoes spontaneous resolution. The small celled type, because of a greater tendency to obstruction of its drainage, more readily suffers pressure absorption and destruction of its trabeculæ with consequent cavitation. With a thick cortex we may have extensive destruction in the depths of the temporal bone, without the usual external signs, but with a greater tendency to break down in the direction of the endocranium. The nonpneumatized and the sclerotic or infantile type is regarded as the most dangerous when it becomes infected.

Another recently recognized factor of great importance in determining the seriousness of an extension of middle ear disease, is the degree of pneumatization of the petrous apex. While pneumatization of other parts of the temporal bone is completed at the end of the fourth year, the petrous apex undergoes pneumatization until the fifteenth year. Infection of the apex is a complication whose serious significance has been appreciated only during the past few years.

What has just been stated concerning the architecture of the temporal bone should indicate the value of the roentgenogram in many cases of middle ear infection. It should also suggest its limitations.

Since every severe middle ear inflammation is accompanied by some involvement of the adjacent parts, we must recognize the fact that we are dealing with a limited or extensive mastoiditis which, according to the structure, is potentially a surgical mastoiditis, or, under favorable conditions, may spontaneously clear up even after postauricular or antral tenderness and tip tenderness have been present. Cases accompanied by tenderness over the zygomatic root and especially over the emissary vein are not so prone to spontaneous recovery. The former conditions usually indicate a perisinus abscess. On the other hand, we may encounter extensive destruction without external signs, even when there has been no discharge, or after the otitis media with perforation has healed. Such cases are very deceptive. They occur frequently with measles and scarlet fever and in otitis media due to streptococcus mucosus. Extension to the mastoid may escape notice until the appearance of a fully developed complication. A streptococcus mucosus infection should be suspected when the drum head shows a pale infiltration and the middle ear is slow in clearing up. In these cases the roentgenogram often reveals a surprising amount of destruction. Bacteriological and blood examinations should be made in all such cases. Cases due to the streptococcus mucosus constitute about 13 per cent of treated acute middle ear suppuration. They occur most frequently after the forty-fifth year.

Another fundamental surgical principle to be always remembered but never to be made the excuse for procrastination, is that in acute cases and in acute exacerbations of chronic cases, we should postpone operative interference long enough to allow the building up of immunity against the invading organism. Aside from this the contra-indications against operation are negligible. Pregnancy is not a contra-indication, nor is lues. Tuberculosis, though accompanied by greater surgical risk, is not a contra-indication.

We should not operate without a complete history and a careful general physical examination,

close neurological and ophthalmological scrutiny, all the usual laboratory tests and a roentgenogram.

Specifically, according to the latest consensus of opinion the indications for operating in acute cases of middle ear suppuration are as follows:

1. We operate at once in all cases, after adequate conservative treatment has been tried, when there is persistent pain and tenderness over the mastoid tip and a purulent discharge has existed for one week. In young children with symptoms of meningeal irritation or with severe gastro-intestinal symptoms and desiccation, we may to great advantage operate the fifth or even the fourth day after the onset of the discharge. In adults a persistently high temperature with the above symptoms often indicates a thrombophlebitis of Koerner caused by a hemolitic streptococcus and also calls for very early operation.

2. Immediate operation is indicated when there is swelling and fluctuation over the mastoid region, especially the tip, or over the zygomatic root, or when there is a hard infiltration toward the neck constituting a Bezold abscess or whenever there occurs edema of the posterior superior auricular canal wall. This last is a most reliable indication even in the absence of other positive indications for surgery.

3. Even though all other symptoms may be absent, we should operate whenever, after adequate treatment, there is a persistent discharge lasting over six weeks. Failure to observe this rule is the cause of the majority of cases of chronic suppuration, *i.e.*, a chronic mastoiditis.

(At this point we would deprecate the fallacy of repeated incisions of a drumhead whose opening is already giving adequate drainage. The diseased area in such a case is beyond the middle ear. It is also futile to attempt to relieve aural pain by this procedure when it is due to retention and pressure in the mastoid and not in the middle ear, or is due to a circumscribed meningitis.)

4. Operation is urgently demanded with the onset of a rapid, severe loss of hearing, nystagmus, vertigo, nausea and vomiting. Here we have a threatened or actual labyrinthine involvement, with possible extension through the internal auditory meatus and a consequent diffuse meningitis or cerebellar abscess.

5. The appearance of a facial paralysis also calls for prompt surgery. It may signify destruction in the direction of the vestibule and an impending endocranial complication.

6. A further indication for surgery is the appearance during an otitis media of paralysis of the abducens nerve accompanied with homolateral headache and pain in the eyeball. This frequently indicates a petrositis which is often cured by an early cleaning out of the mastoid whereby the affected petrous cells are drained.

7. The appearance of symptoms pointing to the beginning of an endocranial complication, such as headache, especially unilateral, local discomfort, nausea and the classic neurological signs demands an exploratory operation. Delay for the formation of a capsule in case a brain abscess is diagnosed, is usual but should not be for too long a period. The early cleaning up of the infected area and draining of an epidural abscess may avert a more serious complication. We should recall that a circumscribed meningitis is nature's method of preventing a diffuse meningitis or brain abscess.

8. In the case of early involvement of the blood stream, evidenced by increased leukocytosis, the characteristic chills and temperature curve, even before a positive blood culture is obtained, we should thoroughly operate upon the mastoid and drain the perisinus abscess with the expectation of a fair chance of arresting a sinus phlebitis or a septicemia.

9. A further indication for early surgical intervention is met in patients who have been the subjects of one or more previous operations on the temporal bone. Here we may have old tracts leading to areas covered with granulations or organized connective tissue of low resistance, the dura often having already been exposed. Under such conditions delay may invite serious complications.

10. The indication is to operate earlier rather than later in cases associated with the exanthemata and debilitating diseases.

The radical mastoid operation is performed chiefly to cure a chronic suppuration of the middle ear which does not yield to persistent, thorough, conservative treatment. This may include ossiculectomy and even removal of the lateral attic wall. It is also indicated in both acute and chronic otitis whenever it becomes necessary to explore either the middle or posterior fossæ in searching for an endocranial complication.

Briefly stated, the indications for resorting to

the radical mastoid operation in chronic suppurative cases are as follows:

1. Failure to secure a dry ear by the usual conservative treatment. This is the most important and the one most frequently ignored.
2. Evidence of labyrinthine involvement.
3. Evidence of the development of brain abscess, meningitis or pyemia.
4. The formation of a subperiosteal abscess.
5. The appearance of facial paralysis.

We most frequently fail in our duty to the patient with a chronic suppurative otitis media. As a rule, he has not been sufficiently impressed with the importance of securing a dry ear. Failure to attain this condition by adequate treatment indicates that the bone is diseased in its deeper parts, the affected regions being often surrounded by sclerosed areas. How serious the condition may be even the roentgenogram does not reveal. Cholesteatoma frequently erodes extensive areas exposing them to the possible invasion of a virulent organism which may enter through the upper respiratory tract or through the blood stream. No one can tell when, under conditions of lowered resistance, a spectacular and alarming flare-up may occur. He who advises a patient to disregard a persistent discharge from the ear as a mere trifle, to be ignored until definite symptoms indicating the need of operation appear, is inviting disaster to his patient and criticism for himself. The mortality from such cases where operation becomes necessary after the occurrence of a complication is extremely high, whereas it is practically nil where operation is properly performed before complications set in.

Conclusions

1. Operations for the cure of suppurative diseases of the middle ear, whether acute or chronic, should be performed promptly and fearlessly as soon as surgical intervention is definitely indicated, if we would materially reduce the deplorably high death rate from these common ear diseases.

2. It is far safer to err in the direction of operating too early rather than too late.

3. The responsibility for the recognition and adequate care of cases of suppurative otitis media needing surgical attention rests more heavily on the general practitioner and the pediatrist who see them first than upon the otologist, who frequently is not called in consultation until after serious complications have arisen.

THE RELIEF OF ACUTE ASTHMA BY THE INTRAVENOUS ADMINISTRATION OF CONCENTRATED GLUCOSE SOLUTION*

Report Of Cases

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HYPERTONIC glucose solutions have been administered intravenously in uremia, myocardial insufficiency, infectious disease, bichloride poisoning, tetanus, ocular disorders, skin lesions, nervous disturbances, and edema of the lungs. In severe and prolonged bronchial asthma it was assumed that the patient suffered also from a secondary pulmonary edema, and that, if the edema was relieved, the patient's asthma would be improved. On the above assumption and observation, a 50 per cent glucose solution was selected for intravenous administration. Such a solution placed in the vascular system would withdraw fluids from the tissues and act also as an excellent diuretic.

Report of Cases

Case 1.—Chronic bronchitis, bronchiectasis, bronchial asthma, cholelithiases.

The patient was forty-eight years old, married and had eight children. The past history was negative except for a tonsillectomy. The present trouble began five years ago with an upper respiratory infection, leading to a chronic bronchitis and occasional asthmatic attacks. The asthmatic attacks gradually became more frequent and longer in duration. In the morning the patient

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would have prolonged coughing spells, and then raised a great deal of sputum. Various drugs, vaccines, and inhalations had been tried with very little relief. On admission to the hospital she was receiving in twenty-four hours, two hypodermics of adrenalin chloride, 8 m. each, 1/6 gr. hypodermic of morphia, and two capsules of ephedrin-amytal compound. The physical examination was negative except for typical findings of a chronic bronchitis, bronchiectasis, bronchial asthma, and a symptomless cholelithiasis.

The patient was admitted to the hospital on April 24, 1933. On April 26 she received intravenously 15 c.c. of a 50 per cent glucose solution. No particular change was noted. On April 27, she received 20 c.c. of a 50 per cent glucose solution. The next day she said the breathing was easier. On April 28, she received 50 c.c. of a 50 per cent glucose solution. The asthma disappeared. No further adrenalin, ephedrin, or opiates were necessary. The cough was embarrassing and considerable sputum was being raised daily. Since there were no further attacks for a week the patient was discharged from the hospital and advised to take mild sedatives for controlling the cough.

She appeared at the office on October 2, 1933, stating that she felt quite well except for the cough, and free from asthma until about a week ago. She had again typical findings of a bronchial asthma. On October 2, 25 c.c. of a 50 per cent glucose solution was given intravenously, and on the third, fifth, and sixth, 50 c.c. of a 50 per cent glucose solution was given at the office. She was again very much improved.

Comment: Although the treatment was not remarkable it was nevertheless encouraging. After the first series of glucose administrations the patient was free from asthma for nearly five months. The second group of glucose injections also relieved the asthma.

Case 2.—Chronic bronchitis, bronchial asthma.

The patient was forty-two years old, a female, and married, with a negative past history except for bronchial asthma for one year, twenty years ago, and a "nervous breakdown" in 1931.

In the spring of 1933 following an upper respiratory infection she developed a chronic bronchitis with nocturnal attacks of bronchial asthma. On June 14, 1933, she entered St. Joseph's Hospital and was given six hypodermics of adrenalin chloride, 8 m. each, and two hypodermics of pantopon, gr. ⅓, for the relief of the asthma in the first twenty-four hours. The physical examination was negative except for typical findings of a chronic bronchitis with bronchial asthma. The laboratory findings were also negative except for an eosinophilia of 9 per cent.

June 15, she was given 80 c.c. of a 50 per cent glucose solution intravenously. Following this administration only two hypodermics of adrenalin in twenty-four hours were necessary to control the asthma. On June 16, she was given 100 c.c. of a 50 per cent glucose solution intravenously. The asthma disappeared, no further glucose was given, and she was discharged from the hospital August 2, 1933.

On July 31, 1933, she was readmitted to the hospital again stating that she had been free of asthma for one month and then it recurred. On July 31, and August 1, she was given 100 c.c. of a 50 per cent glucose solution intravenously. The asthma disappeared and she was discharged from the hospital August 2, 1933.

Comment: The results in this case were almost dramatic. Two injections relieved the asthma, and when it recurred one month later, two injections again were sufficient to control the attacks. The patient still has chronic bronchitis, and may again have asthmatic attacks.

Case 3.—Chronic bronchitis, bronchial asthma.

The patient was married, thirty-five years old, and had a negative past history except for frequent "colds." The present onset of asthma began nine years ago following an upper respiratory infection. The general physical examination showed septic tonsils, typical findings of bronchial asthma, left inguinal hernia, and a 5 per cent eosinophilia.

He was admitted to the hospital on July 27, 1933, and 100 c.c. of a 50 per cent glucose solution was given intravenously. The asthma disappeared, the tonsils were removed, and a few days later he was discharged from the hospital. On October 12, 1933, in response to a letter he appeared at the office, and said that he had had no asthmatic attacks but on examination there was some wheezing in the chest. He was given 50 c.c. of a 50 per cent solution of glucose on October 12 and 19, for the determination of its effect on this type of breathing. The breathing was definitely improved.

Comment: The patient's attacks varied a great deal in duration, and although he thought that the treatment was most efficient, one should cautiously draw conclusions from a single injection. The effect on the asthmatic bronchitis was said to be favorable.

Case 4.—Chronic bronchitis, bronchial asthma.

The patient was forty-three years old, married, and the past history showed frequent colds, operated sinuses, and a tonsillectomy. The asthmatic attacks began six years ago. She had been treated by autogenous vaccines, adrenalin chloride, ephedrin, various medicated inhalations, opiates, and hypodermics of morphia. There were typical findings of an asthmatic bronchitis with an eosinophilia of 14 per cent.

When the patient was examined she was suffering only with an asthmatic bronchitis. On September 12 and October 3, 1933, she was given 50 c.c. of a 50 per cent glucose solution intravenously to observe its effect on the asthmatic bronchitis. The breathing was improved.

Comment: The patient stated she breathed much easier after receiving the injections, and the last examination of the chest revealed no whistling sounds. Since asthmatic breathing has been known to vary a great deal in severity from day to day, or even during the same day, definite inference must be made with caution.

Indications

At the present time it would seem that good results with this form of treatment were obtained in the long, severe, and continuous asth-

matic attacks, and asthma superimposed most probably on an asthmatic bronchitis due to an upper respiratory infection. Less remarkable results have been noted also in the lighter forms of asthma. It is possible that with increased knowledge obtained by trial and experiment very definite indication will be established for the type of asthma, the optimal dose, and the frequency of administration.

Administration

A word about the administration may prevent accidents and unfavorable results or reactions. A 50 per cent sterile solution of glucose was heated to 95 degrees Fahrenheit to avoid constitutional reaction. This solution was administered slowly by syringe through a medium sized needle. If the needle is too small there may be great difficulty in forcing the solution through the needle. If the needle is very large the solution may run into the arm too rapidly and produce a clot at the point of injection. Placing the arm in a horizontal position or even slightly lower than the forearm will also aid in preventing the coagulation of blood in the vein. Occasionally during the last part of the glucose administration the patient may complain of soreness in the arm. The pain follows the course of the vein and is undoubtedly due to an irritation of the venous wall by the concentrated glucose solution. It is possible that less concentrated solutions may give the beneficial pulmonary results and yet reduce the local danger of a thrombosis, or phlebitis.

Discussion

An intensive search of the medical literature revealed only one article published by Schafir[1] in 1927 under the title: "Treatment of Bronchial Asthma by Intravenous Injection of Grape Sugar." In the article reference was made to "Stein and Others," but their publications could not be found. He treated fourteen patients, ranging in age from 16 to 48 years. The duration of asthma was one to seven years. One patient, however, had asthma for two months only. Colds, fright, linseed oil, and wood pulp were stated as the causative agents. Intravenous administration of a 20 per cent glucose solution in 10 c.c. doses, was given for six to twenty days consecutively. Eleven patients had no reaction, while three showed a slight fever about ten hours after the injection. The results showed that during the treatment the attacks became less severe every day. In nine patients the attacks were gone for five months. In one case the attack recurred in less than a month, and was again relieved by the administration of glucose. When it recurred the third time, a 30 per cent solution was given, and the patient remained well for three months.

All of our patients attributed the asthma to an upper respiratory infection. The duration of asthma was from six months to nine years. Every focus of infection had been eliminated except in the third case, where septic tonsils were found and later removed. Two of the patients came under observation during a continuous siege of severe asthma over a period of several weeks. One had an acute attack superimposed on a chronic asthmatic bronchitis, and another had chronic asthmatic bronchitis only. In the first case, three intravenous injections of glucose eliminated the asthma, and when it recurred nearly five months later four injections again relieved the asthma. The second case was controlled by two injections and one month later the recurrence was also relieved by two injections. In the third case one injection was given during an acute attack, and in twenty-four hours the patient was free from asthma. The action on asthmatic bronchitis was less favorable. There was no constitutional reaction, but locally a few times a clot formed in the vein at the point of injection. The administration was then discontinued and the solution given in another vein.

The mechanism through which glucose acts is not clear. Some contend that the beneficial results follow an improved effect on the myocardium, while others consider glucose as an antidote for the toxic metabolites. The most common view, however, attributes the improvement of the patient to changes in the osmotic pressure in the tissues. Briefly, the concentrated glucose solution introduced into the vascular system withdraws fluids from the tissues and the surplus fluid is then eliminated by the kidneys. Whether or not similar results could be obtained by giving the patient large doses of ammonium salts by mouth or salyrgan by vein has not been demonstrated. Whatever may be the action, the glucose has a favorable effect on the intensity, as well as on the frequency, of the attacks.

The action of glucose is slow, requiring days, rather than minutes as in the case of adrenalin,

to show results. The effects, however, are more lasting and can be calculated in weeks or months rather than in hours or days. It is not a cure for bronchial asthma, but for its relief the treatment may be recommended. Indirectly it may also favorably influence the chronic bronchitis.

Summary

1. Four cases of bronchial asthma, secondary to an upper respiratory infection, were treated intravenously with a 50 per cent glucose solution.

2. Various amounts were tried, but the best results in the bedridden patients were obtained with 100 c.c. of glucose solution given consecutively for two or three days.

3. In the ambulatory type 50 c.c. of a 50 per cent glucose solution administered for several days gave encouraging results.

4. Concentrated glucose solution relieved the intensity as well as the frequency of the asthmatic attacks.

5. The attacks of asthma sometimes were relieved completely for several months.

Conclusions

1. It is possible that the intravenous administration of glucose solution may become a permanent adjunct in the routine treatment of severe bronchial asthma.

2. From the above study and reports in literature too little is known about this method of treatment to make any definite claims for it.

Reference

1. Schafir, M. M.: Treatment of bronchial asthma by intravenous injection of grape sugar. Vrach. Gaz., 31:1584-1589, 1927.

THE EYE IN CARDIOVASCULAR DISEASE*

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THERE has been, in the past thirty years, a definite increase in the incidence of cardiovascular disease. This is only partially accounted for by the gradually increasing length of life and the consequently larger percentage of the population attaining the age when certain forms of disease of the heart and blood-vessels are more common. Some forms of cardiovascular disease are obviously on the decrease. Improved methods of treatment of syphilis and more general recognition of the importance of the elimination of foci of infection have been responsible for the fact that luetic disease and the various clinical entities which were formerly grouped under the heading of "rheumatic" affections of the heart and blood-vessels are less frequently encountered than they were twenty or thirty years ago. This decrease has, however, been more than counterbalanced by the increase in the number of cases of the coronary sclerosis-hypertension group.

Naturally each organ reacts to the effects of abnormalities of the circulatory system in general and of its own blood-vessels in particular in a manner determined by its own particular structure and function. The effect of vascular disease on the eye is influenced by the delicacy and complexity of the eye tissues and by the fact that the circulation of the retina is largely effected by terminal vessels which do not anastomose, thus usually precluding the possibility of the development of a collateral circulation in the event of a partial or complete occlusion of a vessel.

The study of the eye changes in cardiovascular disease is of unique interest and importance both from a diagnostic and a prognostic standpoint. Here, with the ophthalmoscope, can be observed in the living patient, under magnification, the blood-vessels of the retina, affording an opportunity to detect the presence of vascular pathology and to observe its progress.

The pathologic states in the cardiovascular system which are, at times, reflected in the eye may be grouped under the following headings: (1) organic disease of the heart; (2) sclerosis or aneurysm of large vessels giving rise to pressure on adjacent nerves with consequent impairment of function; (3) hypertension; (4) sclerosis of the vessels of the choroid and retina; (5) embolism and thrombosis of the intrinsic blood-vessels of the eye; (6) diseases of the blood

*Thesis read before The Minnesota Academy of Medicine, November 8, 1933.

which alter its composition and secondarily affect the function of the capillaries and the integrity of the capillary walls.

Disease of the heart may make itself evident in the eye by pulsation of the retinal arteries. While venous pulsation is often observed as a physiological manifestation, visible pulsation of the arteries of the retina is always pathological. In left ventricular hypertrophy associated with hypertension an arterial pulsation extending to the periphery of the fundus is not uncommon. A true pulse wave, synchronous with the radial pulse, is seen in aortic regurgitation or aortic aneurysm as well as in some cases of hyperthyroidism. Capillary pulsation appears as a reddening of the optic disc in systole and a blanching in diastole and is observed only in aortic regurgitation. Embolism of the central artery of the retina sometimes occurs with mitral stenosis, especially in the presence of a fresh endocarditis. In congenital heart disease the retinal vessels, particularly the veins, are usually dark and greatly engorged; sometimes small hemorrhages are present.

Thickening and sclerosis of the internal carotid or the ophthalmic arteries may give rise to sufficient pressure on the optic nerve to cause atrophy with consequent impairment or loss of vision. C. N. Spratt has reported a very interesting case of aneurysm of both vertebral arteries. The patient had had severe headaches for ten years; at first frontal and finally localized more in the left occiput. The vision remained good but he was led to consult an oculist because of a diplopia resulting from a complete paralysis of the external rectus muscle. Anesthesia on the left side of face, anosmia, horizontal nystagmus accentuated on looking to the left, death and autopsy followed.

Hypertension is a very imperfectly understood clinical entity. It is, of course, a symptom and not a disease *per se* and would seem to be the manifestation of some underlying pathological state which may, in some cases, be the result of a toxemia or of some metabolic disturbance; in others, be secondary to an essential derangement of the vasomotor centers in the central nervous system. Our present knowledge as to the etiology and essential nature of hypertension is extremely limited but it is clear that it first manifests itself as a pure vasopasm and that as this condition persists the primary abnormal physiologic process gradually gives rise to organic changes in the vessel walls. It is natural, therefore, that the first evidence of hypertensive disease observed in the fundus should take the form of a vasopasm which may affect the central artery and thus cause an ischemia of the entire retina (except the outer layers which are supplied by the choroidal vessels) or may involve a branch, in which case only a sector of the fundus is affected. This is usually the forerunner to the development of a typical hypertensive retinopathy but it may, in some cases, disappear, leaving no visible fundus changes and no impairment of function. (Similar vascular spasm has been described in Raynaud's disease, in lead poisoning and in migraine.) In the hypertension fundus, therefore, the arteries, from the first, appear to be contracted and the veins disproportionately large. The arterial narrowing may affect the entire length of the vessel or only segments of it. In addition to the variations in caliber of the vessels' increased tortuosity, especially of the smaller branches, has been described, but this is of comparatively little diagnostic importance since great variation in the tortuosity of vessels is observed in the normal fundus. Marcus Gunn over forty years ago described the characteristic brightening and widening of the central light streak of the arteries which he likened to the metallic appearance of bright copper wire. Whitish lines may appear along either side of an artery and sometimes, in the later stages, the arteries are reduced to threads, having become thrombosed and gradually obliterated. However, as Burch says, "these are evidences of the type and not of the simple fact of elevated blood-pressure." That is these changes are the result of organic disease in the vessel walls which occurs secondarily to continued hypertension. Also characteristic of the hypertension fundus is the effect produced upon the veins by the overlying arteries. Under normal conditions it is possisble to see the vein through the artery at the point of crossing and the crossing has no apparent effect upon the form or level of the vein. In hypertension the veins show the effect of the increased arterial pressure and are compressed or, at least, pushed back into the retina. In the later stages in advanced cases the vein is invisible at the point where the artery crosses it and may be considerably distended for some distance peripheral to the point of crossing. There also develops a definite change in the angle

at which the arteries cross the veins. This more nearly approaches a right angle as time goes on, the alteration being due to a contraction secondary to degenerative changes in the perivascular tissue at the point of crossing.

It is, of course, axiomatic that hypertension is often observed in the absence of arteriosclerosis as sclerosis may occur without hypertension. The arterio-venous compression described is not necessarily a sign of retinal arteriosclerosis but may be present in advanced and characteristic form in a pure hypertension. The continued presence of a hypertension eventually gives rise to organic changes in the arteries, arterioles and capillaries. The exact nature of the relationship between the raised blood-pressure and lesions found in the retina is still imperfectly understood. We do not know why, in many cases, a maximal hypertension may exist for a long time and never have any apparent effect upon the retina, while in others, with identical general physical findings, the typical fundus picture of a hypertensive neuroretinopathy is seen. At any rate, all of the retinal lesions occurring in hypertensive retinopathy are to be ascribed primarily to the ischemia of the retina produced by the spasm of the choroidal and retinal arteries which occurs as a part of the general vasoconstriction which characterizes hypertension. Often the first sign to be noticed after the contraction of the vessels appears is an edema of the nerve head. The disc is swollen and the margins indistinct. It may be hyperemic in the "red" type of hypertension (that is, in the essential type of hypertension when renal function is good), and pale in the form which occurs in association with glomerulonephritis, in essential hypertension with renal insufficiency, in eclampsia gravidarum, lead poisoning and urinary obstruction when associated with glomerulonephritis. The color of the disc is naturally affected by the hemoglobin content of the blood. In the late stages of essential hypertension there is found the characteristic pallor of optic atrophy. Sometimes the elevation of the disc may be sufficient to cause an appearance which cannot be distinguished from that of the true choked disc of increased intracranial pressure. Cushing and Bordley described a case of chronic renal disease with hyperpiesis and extensive retinal lesions in which the intracranial pressure was so greatly increased as to necessitate a subtemporal decompression. However, increased intracranial tension is observed in only a small percentage of cases of hypertensive retinopathy. In the great majority of patients, in spite of a considerable swelling of the disc and extensive retinal lesions, the intracranial pressure is well within normal limits. The edema gradually spreads out for a greater or less distance into the adjacent retina and gradually becomes whiter and more opaque. If the edema involves the macular region there is a sudden and profound diminution of vision. Frequently following edematous changes there appear scattered through the fundus, particularly in the area near the disc and between it and the macula, white spots of various sizes and degrees of brightness. In the early stagess they often have a cotton wool appearance, later becoming more sharply outlined and "harder" in appearance. This change is probably due to the absorption of the edema. These "cotton wool" spots which have so often been erroneously referred to as "exudates" are really the result of actual tissue necrosis and are, essentially, minute infarcts due to occulsion of the arterioles. The arrangement of these spots and streaks in a star figure in the macular region has been described as characteristic of "albuminuric retinitis" but it may be found in any disease in which there are degenerative changes in the retina. Hemorrhages are usually but not always present. They are often flame shaped, sometimes linear or rounded and irregular, the shape being dependent upon their location, the radially elongated hemorrhages being in the nerve fiber layer, the others lying more deeply. The hemorrhages are almost always capillary in origin. They may rarely be subhyaloid. (Small hemorrhages in the retina are sometimes seen in acute or subacute glomerulonephritis and these are analogous to the purpuric spots in the skin which are not uncommon in this condition.)

As early as 1836, Bright, in his epochal treatises on diseases of the kidney called attention to the fact that impairment of vision, apparently attributable to the nephritis, occurred in a certain percentage of cases. In 1850, several years before the discovery of the ophthalmoscope, Turck demonstrated the presence of areas of what appeared to be fatty degeneration and concluded that the reduction in sight was due to disease of the retina. The validity of his conclusions was demonstrated as soon as the examination of the fundus of the eye became possible. Liebreich,

in 1859, gave the first accurate description of what he termed "albuminuric retinitis" and for many years under this generic term were included three pathogenetically distinct retinal diseases—hypertensive neuro-retinopathy, arteriosclerotic retinopathy and choked disc due to edema of the brain. In the face of accumulating evidence to the contrary there has been an extraordinary persistence of the old conception that primary disease of the kidney caused the retention of certain toxic substance in the blood which secondarily affected the tissues of the retina. This accounts for the continued use of the term "albuminuric retinitis" in spite of the fact that the condition is not a retinitis since the lesions are for the most part not inflammatory in nature and it is not "albuminuric" since it has no connection with the presence or absence of albumin in the urine; in fact, it is precisely in the nephroses in which albuminuria is at the maximum that retinal changes do not ever occur. At any rate, it is now, I believe, generally accepted as an established fact that retinal changes are not encountered in renal diseases unless hypertension is or has been present. As Fishberg says, "That, in general, all the changes in the fundus observed in hypertension and renal disease are primarily due to the hypertension is obvious from the fact that they never occur in its absence." Even in the presence of disease causing widespread destruction of kidney tissue such as tuberculosis, neoplasms, septic kidney, etc., no retinal changes are found unless hypertension has supervened. If a hypertensive retinopathy is found in the presence of a normal or subnormal blood pressure, it is because of myocardial disease and resultant cardiac failure or as an evidence that the process is regressing with a correspondingly more favorable prognosis. Therefore, in kidney disease associated with pathological conditions in the choroid and retina we are dealing with an underlying condition which is responsible for both the nephritis and the retinopathy. In general, the kidney is no more to be held responsible for the retinal pathology than the eye condition is to be considered as causing the nephritis.

A typical case is cited by Kahler and Sallman: A patient 32 years old had had a hypertension since she was twenty-five. Her principal symptoms were headache and vertigo. She developed an impairment of vision and fundus examination revealed a typical "retinitis albuminurica" with star figure in the macula and many areas of degeneration. There was no discoverable kidney abnormality. Six months later appeared the first traces of albuminuria, etc., and the patient developed a typical juvenile nephrosclerosis and died of uremia a few weeks later. A case like this emphasizes the fact that under these circumstances one must regard the hypertension as being the underlying factor of both the retinal affection and the kidney disease unless one wishes to assume that the retinal disease was an early symptom of impaired kidney function appearing before it was possible to determine such impairment with our present methods of examination. As has been mentioned, many forms of kidney disease are never associated with retinal changes. This is true of all forms which do not cause the interference with secretory activity which is characteristic of conditions causing a diffuse involvement of the glomeruli. The classic picture of hypertensive retinopathy is most commonly seen in the true diffuse glomerulonephritis, in the nephritis following scarlet fever, angina, colds and lead poisoning, in the kidney complications of pregnancy, etc. The cases occurring in the acute stage may make a complete recovery but when there is a secondary nephrosclerosis or when the disease, from the beginning, exhibits the symptom-complex of this form of nephritis (primary sclerosis) there is increasing liability that the retina will be involved. Retinal lesions are found in about 30 per cent of fatal cases of contracted kidney. Keith, Wagener and Kernohan differentiate between the retinal lesions in severe essential (malignant) hyperpiesis and those which occur in the hypertension associated with glomerulonephritis. Their experience is that in malignant hypertension the edema is less extensive and not so dense and that one less frequently sees the heavy "cotton wool" patches around the disc. They have found the disc to be hyperemic in essential hypertension in contrast to the pallor which they consider characteristic of the fundus picture in nephritis. Evidence of sclerotic changes in the arterioles is always present in malignant hyperpiesis and is infrequent in chronic nephritis.

The eye findings in the hypertensive toxemia of pregnancy show certain distinctive characteristics. Visible fundus anomalies are encountered in about one pregnancy out of three thousand and

usually appear in the second half of the pregnancy. Fundus pathology is found in the greater majority of gravid women in whom the blood-pressure is over 180. The picture is the classic one of hypertensive neuroretinopathy, only different from the ordinary form in that it is apt to be very severe and rapidly progressive in pregnancy and that there is a considerably greater tendency to the development of detachment of the retina. The prognosis of the retinal detachment in these cases is much better than that of detachment in general since spontaneous reattachment usually takes place, but the prognosis so far as the recovery of sight is concerned is, I think, not so favorable as it is generally supposed to be. In a series of fourteen cases of hypertensive retinopathy in pregnancy which I had an opportunity to follow some years ago, only two regained entirely normal vision. The prognosis is naturally more unfavorable in those patients in whom the kidney lesion and hyperpiesis existed prior to the pregnancy and those in whom the hypertension persists after the emptying of the uterus. In the early stages of eclampsia gravidarum one often sees cramp-like contractions of the vessels in the various sectors of the fundus. The location of these areas changes from time to time, finally becoming fairly constant. This is followed by the other characteristic fundus changes previously described.

The Pathologic Anatomy of Hypertensive Retinopathy

The earliest changes to occur under the influence of the hypertension are found in the retinal arterioles. In the slightly thickened walls in specimens stained with hematoxylin-Sedan little reddish points are found. They seem to be identical with those found in the brain in advanced cases of nephrosclerosis with hyperpiesis. They are due to a finely granular lipoid infiltration. There are localized thickenings in the nerve fiber layer of the retina and in section the appearance gives the impression of ganglion cells scattered through the layer. Schiek considers that these are varicose hypertrophies causing a spindle shaped swelling of individual fibers. Friedenwald, however, maintains that they are, in reality, large, swollen, necrotic wandering mononuclear cells. Quite characteristic of hypertensive retinopathy are homogeneous deposits in the deeper layers of finespun, fiberlike areas, the "Faserkörbe" or fiberbaskets and the later formation of empty cystoid spaces. These changes give the impression of a foreign material forcing its way in between the nerve elements: that is, as though spaces opened up between the fibers and nuclei of the second neuron into which material flows and coagulates. It is probable that the radial arrangement of the glial network gives rise to the star figure arrangement in the macular region. Sections stained with osmic acid show the presence of lipoid material which is sometimes in free masses, sometimes as cell inclusions. These "Fettkörnchenzellen" are large, fat-laden phagocytes. They are an evidence of a perverted metabolism of the retinal cells and may occur in any condition characterized by a widespread destruction of retinal tissue.

Arteriosclerotic Retinopathy

In view of the fact that continued hypertension is invariably followed by changes in the vessel walls it is obvious that it may, in some cases, be impossible to differentiate rigidly between lesions due to the late effects of the hyperpiesis and those resulting from a concomitant arteriosclerosis. However, in spite of the frequency with which these conditions are associated, it is not unusual for hypertension to exist without any sign of arteriosclerosis and advanced arteriosclerotic changes may be observed in the presence of a blood pressure well within normal limits. The fundus in a more or less pure arteriosclerotic retinopathy shows certain distinctive characteristics. This naturally is most pronounced in the appearance of the blood-vessels, which show a quite characteristic irregularity of caliber, that is, a segmental contraction which is sometimes so pronounced as to give the vessel a beaded appearance. There may be a perivasculitis with pipestem sheathing of the arteries. In advanced cases the proliferation in the arterial walls may give rise to a complete obliteration of the vessel. The absence of edema of the disc and adjacent retina is one of the most important criteria in differentiating the arteriosclerotic from the hypertensive form of retinopathy. In the former there is no change in the retinal level. Unlike the "cotton wool" patches of the hypertension fundus the spots are "hard" in appearance, generally rather small in size and clear cut in outline without any shading off into the adjacent retina. These spots are usually found

along the course of the vessels and in the area around the disc. Retinal hemorrhages may be present but they are much less frequent in cases of pure sclerosis unassociated with hypertension and are quite rare in the senile form of arteriosclerotic fundus. Marked arteriosclerotic changes may exist in the fundus for years without any impairment of vision. Advanced sclerosis in one of the larger arteries, such as the central artery of the retina, may, in time, exert sufficient pressure on the accompanying vein to cause a thrombosis.

Pathology of Arteriosclerotic Retinopathy

The hyalin-lipoid form of vessel wall involvement has been described as occurring characteristically in hypertension. The other form of primary vascular disease is characterized by the proliferation of the intima and the development of atheromatous plaques. Later, fibrosis of the media and even of the adventitia is not uncommon. This condition probably sometimes leads later to the development of an obliterative endarteritis although the connection has not been clearly established.

In the various general dyscrasias and diseases of the blood the resultant involvement of the vessel walls frequently gives rise to retinal hemorrhages and to more or less characteristic fundus anomalies. To go into a detailed discussion of these conditions would carry one too far afield and would probably not properly come within the scope of this paper.

SOME NOTES ON THE HISTORY OF EPILEPSY

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OLIVER Wendell Holmes said, "If I wished to show a student the difficulties of getting at the truth from medical experience, I would give him the history of epilepsy to read."

The disease epilepsy was known among the ancient Greeks as the disease of Hercules,[18] and also as the sacred disease. It has been suggested that its connection with Hercules alluded to the fact that some epileptic patients seem to possess Herculean strength. Some writers, on the other hand, hold that Hercules himself had the disease and that he had a fit while trying to conciliate the gods with some votive offering. Epilepsy was also called the sacred disease because it was thought that its victims were possessed by something greater than man. The dominance of this idea is exemplified by the theological coloring present in almost all of the ancient concepts of epilepsy. Most of the Latin names used to designate the malady indicate that the gods were suspected of having something to do with the cause and distribution of it, while others implicated evil spirits, and still others the moon. Years later lunar caustic (silver nitrate) was used in the treatment of epilepsy even to the point of argyria. This was done because silver is the color of the moon, and the moon caused madness, and probably is one of the earliest examples of the theory that *similia similibus curantur.*

Other names employed by the ancients to designate what we now call epilepsy were purely descriptive in chracter: *clonus epilepsia, hieranosis prehensio, morbus mensalis* (referring to the periodic occurrence of the fits), and numerous others. *Morbus comitialis* was widely used principally because the comitia or meetings of the Roman Senate were adjourned whenever any of the members had an epileptic fit. Later on, the disease was named after various saints who were thought to have something to do with the distribution of it. Thus, *Morbus Sancti Valentini* and *Morbus Sancti Viti* were widely used.

Many famous historical and literary characters were said to have epilepsy. Among these were Moses, Paracelsus, Cæsar, Moliere, St. Paul, Luther, Dante, Richelieu, Schumann, Byron, and Napoleon Bonaparte. From a study of ancient and biblical writings it is apparent that both grand mal and petit mal as well as Jacksonian epilepsy were recognized by the ancients.

In an earlier paper[9] I stated that "in the early days of modern medicine almost every disease accompanied by convulsions was called epilepsy. Brain tumor, syphilis of the central nervous sys-

tem, uremia, various intoxications and convulsions due to congenital deformities of the brain all were included under the general term 'epilepsy.' As our medical knowledge and diagnostic acumen advanced, these entities gradually were sifted out from the general group until today the diagnosis of essential epilepsy is made only after all other possible causes for the convulsions have been excluded." The treatment of any disease is directed, whenever possible, toward the supposed cause of it. Consequently as the various beliefs concerning the cause of epilepsy changed through the ages, so changed the treatment.

As in so many other diseases, the early treatment of epilepsy was based on various demoniacal theories and superstitions. Hence it consisted mainly of incantations and various forms of purification. However, history tells us that trephining of the skull, which is one of the earliest of all surgical procedures, was employed by the ancients in the treatment of epilepsy. This operation was performed probably in the belief that the disease was due to the existence of evil spirits in the patients' head. Some of the substances used as medicine in those days were: castoreum, brain of the camel, heart of the hare, rennet from a seal, blood of a tortoise, crushed pigs' testicles in milk, testicles of old rams, and the luke-warm blood of slain gladiators. Von Storch wonders about the present-day administration of the liver of the cod, heart of the beef, pancreas of the pig, and fresh gall of the ox. Fasting and dehydration, which are used in our present day treatment of epilepsy, were also recommended before the birth of Christ.

In biblical writings various forms of improper conduct were given as the cause of epilepsy. For instance, "Who stands naked in front of a burning light will become epileptic, and who cohabits with a light lit will beget epileptic children." It has been suggested[13] that rather than being promulgated as causes of epilepsy, these words were warnings against improper conduct as a threat against punishment. Other examples[13] are, "When a child younger than one year is lying at the feet of a couple during coitus it will become epileptic"; also, "Coitus immediately after defecation . . . or after blood-letting has the same consequences for the children." These dicta probably were more in the sense of sanitary laws rather than actual beliefs as to the cause of epilepsy.

According to history Hippocrates was one of the first to believe that the disease was due to physical causes existing in the brain; but, before the new testament was written the world reverted again to the ancient conceptions, *i.e.*, that various gods and demons were the causative agents. It might be remarked that in modern times (gods and demons no longer existing) certain schools of thought, namely the psychoanalysts, ascribe the seizure to certain types of emotional possession and propose to cure them by more modern forms of incantation and purification such as "mental catharsis," "transference," "psychoanalysis," etc. In view of the most recent advances in our knowledge as to the real causes of the convulsive state, the philosophy behind this method of procedure seems to me somewhat archaic.

Galen held more to the mystical and humoral concepts of epilepsy although in some of his writings he did ascribe the seizures to the then popular notion that the fits were due to "a certain obstruction of the ventricles of the brain by which the animal spirit is prevented from flowing freely into the nerves of sense and motion." Apparently it was believed that the body contained four humors and three spirits. The humors were the pituitrous, the melancholic, the blood and the yellow bile. Good health depended upon the proper temperature, mixture and circulation of these humors. The three spirits were "invisible and impalpable." They were the natural, the vital and the animal. The animal spirits were manufactured from the vital spirits in the heart, which in turn were manufactured from the natural spirits in the liver. The animal spirits were transmitted to the brain by the arteries, and then transmitted by the cerebellum, medulla spinalis, and peripheral nerves to the entire body. I believe that Hippocrates implicated the pituitrous humor in the brain causing an obstruction of the ventricles and then convulsions. Be that as it may, this humoral concept apparently formed the transition stage between the mystical, demoniacal concepts and the more modern views based on scientific physiology. Galen's views colored medical thought for nearly 1,400 years. The fault, however, lies not with the dead Galen so much as with the men who perpetuated his ideas through the following centuries. In England as late as 1000 A.D., probably through the influence of the church, the divine concepts of epilepsy were still in vogue. At that time the disease was treated with what

were known as cramp rings.[18] These were made from silver obtained at a communion service, or from coffin nails, or even pieces of navel string.

In the early and middle parts of the seventeenth century men began to take a more rational view of epilepsy. Thus, it was recognized that the aura was a part of and not the cause of the seizure. Observers began to classify the various forms of the disease on a more scientific basis, and one of our modern drugs, digitalis in the form of foxglove, was recommended as a treatment. Another drug, valerian, which was one of the earliest of all sedatives, was recommended in 1730 by Fabius Columna,[15] who wrote, "It has been found by many . . . that the powdered root of valerian taken in a half-spoonful of wine, water, milk or other convenient fluid, once or twice according to the constitution and age of the patient will free him from epilepsy . . . ." That medical thought was not yet entirely free from mystical influence may be seen in the following quotation from the same author: "The swallow-stone, which is found in the swallow's stomach at the beginning of the autumn in the first quarter of the moon, reduced to powder and given in any suitable liquid is highly praised against epilepsy. It may also be simply hung on the neck." The same author also recommends the use of the carp-stone, saying, "The carp stone shaped like a half-moon which it (the carp) has over his eyes is noted for that kind of apoplexy which is accompanied by convulsion and contraction of the muscles over the eyes." Among the remedies suggested at that time were oak mistletoe, peony root, the skull of a man who has suffered violent death (calcium?), deers' horn, and about four thousand different powders. A rather novel form of treatment was as follows: "Take a drachm of camphor, divide it into nine parts and give it to the patient to drink in his own urine, then bind on his navel a piece of toasted rye bread and let him sweat in a warm room in a bed well covered over."[16]

In 1705 a case of pituitary tumor with blindness and epileptiform convulsions was reported.[18] Later on in the century, although the pathology of epilepsy was still imperfectly understood, its treatment was on a much more rational basis. The usual childhood convulsions were separated from the true epilepsies, and it was discovered that during the fit itself treatment should be conservative and protective. Epileptics were forbidden to use alcohol or to engage in strenuous exercise.

Continued progress along more scientific lines in the nineteenth century resulted in a modernization of many of the theories concerning epilepsy. The demoniacal, divine, mystical, and humoral concepts were gradually overshadowed by theories founded on known anatomical and physiological facts, although between the manifold types of epilepsy as we know them today there was as yet no extensive differentiation. A certain predisposition to epileptic seizures was recognized but the actual mechanics of the convulsion were unknown, and localization was frequently faulty.

In 1853 at a meeting of the Royal Medico-Chirurgical Society in London, Sir Charles Locock[14] reported that fourteen months previously he had seen a patient who was afflicted with what he called hysterical epilepsy. All of the then known remedies had been tried but without avail. One year previous to Sir Charles' report the patient had been given potassium bromide in varying doses and at different intervals corresponding to her menstrual periods. Under this treatment the spells ceased altogether, and after the effect of bromide in epilepsy became more widely known numerous men became converted to its use. Its popularity grew rapidly and the usual over-enthusiasm developed, resulting in over-dosage which caused numerous cases of bromide delirium, toxic psychosis and stupor. It was even suggested that bromide of potassium might be used as an anesthetic in surgical operations, but this never proved successful. The *modus operandi* of bromide was not clearly understood and it was believed that the drug exerted an "alterative" effect similar to that of iodide of potash. Among other drugs recommended during the middle part of the nineteenth century[14] were phosphorus, opium, belladonna, alcohol, and zinc.

The advance in knowledge of the disease epilepsy and of medical knowledge in general in the nineteenth century led to the formulation of countless theories as to the cause of epilepsy and to the propounding of innumerable forms of treatment. However, the old demoniacal and theological influences were now dead, and thought proceeded along lines that were more strictly anatomical and physiological. Cerebral localization and theories relative to the influence of changes in cerebral circulation were advanced. The medulla oblongata was implicated in the

causation of the convulsive state and this theory has its modern counterpart in the recent work of Davis and Pollock[4] who in 1928 hypothecated a center in the medulla oblongata "from which a convulsion can be released following a suitable stimulus."

In 1860 Brown-Sequard[1] considered that epilepsy was due to cerebral anemia with an accumulation of venous blood containing an excess of carbon dioxide. This and other theories have recently been reiterated by Stanley Cobb[2] and other investigators.

In Radcliffe's book written in 1866 and containing his lectures on Epilepsy, Pain and Paralysis, the author states that the convulsions are connected with a state of *depressed* vital energy rather than with the contrary state of things. He based this belief on the fact that before a convulsion the patient becomes pale and his pulse grows feeble. Furthermore, respirations cease and therefore, reasoned Radcliffe, there must be a "corresponding degree of depression in every vital energy." He argued that the full, bounding pulse during a convulsion was a pulse of *black* blood, the pulse of suffocation, or "apnœal" blood as he called it. Although some of his ideas appear to be rather vague and indefinite, it can be seen from a reading of his lectures that he associated the epileptic seizure with some circulatory change. He believed that the convulsion caused by an irritative cerebral lesion was due to vasomotor spasm induced by the irritation, and he also recognized uremia as one of several causes of convulsions.

Concerning treatment, Radcliffe opens his remarks with the statement, "There is reason to believe that the diet in many cases of chronic convulsive disorder ought to contain somewhat more than an average quantity of oily and fatty matters, and somewhat less than an average quantity of lean meat." Anybody familiar with the principles underlying the modern ketogenic diet will immediately experience a feeling of familiarity with the words. However, Radcliffe did not know the physiological chemistry underlying this diet but thought that lean meat induced a "semi-gouty condition of the blood" which in some way caused seizures. He ascribed the beneficial effect of potassium bromide to the belief that this salt corrected the semi-gouty condition of the blood. A diet high in fat was recommended because in many cases benefit had been derived through the administration of cod liver oil. Radcliffe began to give cod liver oil and recommended high-fat diet in about 1866. His reason was that chemical analysis showed that "fatty matter is . . . an important ingredient of brain tissue." He reasoned that fatty matter might be as essential to the proper nutrition of nerve as flesh meat is to the proper nutrition of muscle. Since he believed that convulsion was the result of depressed vital energy, he argued that the energy could be replenished by a diet abundant in fat. While these views are not strictly in accord with our most modern teachings of ketogenesis, the clinical results at the time led to the continuance of the high-fat diet in epilepsy.

As in many other diseases, the ovaries were at one time implicated as a cause of epilepsy. In 1870 Echeverria[5] wrote, "A female epileptic died at the hospital with all the symptoms of spinal apoplexy confirmed by autopsy. She had been subject to deranged menstruation. During her last days the right parotid and submaxillary glands became enlarged sympathetically, on inflammation of the right ovary, as manifested by the autopsy. This is the first anatomicopathological confirmation of this sympathy of the ovaries which I pointed out clinically some time ago." As treatment Echeverria advocated, among other things, "counter-irritation over the ovarian regions by painting the parts with blistering collodion and finally to move the bowels when necessary by an enema of tincture asafœtida and turpentine." This same author was also very enthusiastic about hypodermic injections of strychnine and his book contains reports of cases which apparently were marvellously benefited by this drug. Hypodermic injections of curare, and extract of conium which was supposed to "diminish the irritability of the spinal cord and have a special narcotic effect on the pneumogastric nerve," were also highly recommended.

In 1881, Sir William Gowers[7] published his epochal work on epilepsy, which, from a clinical standpoint, is still a masterpiece. The physiological principles expressed by him and his clinical observations have stood the test of time. He differentiated between organic or symptomatic epilepsy, and true or idiopathic epilepsy; he recognized the tonic and the clonic phases of the seizure; he stated that "a single convulsion does not constitute epilepsy"; and he recognized the hereditary tendency of the disease. All of these observations still are regarded as being accurate, and probably the only additions that have been

made to Gower's work have been along physio-chemical lines.

In 1888, J. Leonard Corning[3] divided the principal methods of treatment of epilepsy into three groups: surgical, medical and dietetic. Under surgical procedures he mentioned trephining to remove scars and the elevation of depressed fractures. He stated that the percentage of these cases was small although the results were good. Apparently ovarectomy enjoyed a popularity that was only brief. Under medicinal measures Corning listed valerian, chloral, wormwood, hyoscyamus, belladonna, oxide of zinc, silver nitrate, chloroform, ether and amyl nitrate. He stated that since 1875 bromide had become very fashionable. Dietetic management is referred to very little. In status epilepticus continuous carotid compression was advised, and Corning devised a clamp-like instrument which patients were directed to wear for days and weeks at a time in order to prevent seizures.

In our present century probably the earliest important contribution to the treatment of epilepsy was the introduction of phenobarbital (luminal). This drug has now supplanted bromides and the others almost entirely, although Ulrich[17] in Switzerland still uses bromides in conjunction with a restricted chloride intake. There apparently is an inversely proportional relationship between the blood chloride and the blood bromide. Ulrich has worked out this relationship and has plotted curves by which one can determine how much bromide by mouth is required to maintain a constant bromide level in the blood in the presence of varying amounts of chloride in the diet. Ulrich now keeps the chloride intake low and constant and finds that a minimal amount of bromide will control the seizure and not produce bromism. I was very much impressed by the clear skin and alert expression of the large number of patients whose convulsions were held in abeyance by the daily administration of a soup made from a cube which, in addition to an extract of various ingredients of soup, contained a bromide and sodium chloride in the proper proportion (Sedabrol). The patients' diets were otherwise salt-free.

The late Doctor Julius Grinker[8] was the first one in America to use phenobarbital (luminal) in the treatment of epilepsy, and in 1920 he published an article reporting his experiences with this drug, which he began using in 1913. He stated, however, that luminal was used first in Germany by A. Hauptman, who published his results in the Muenchner Medizinische Wochenschrift in 1912. Although phenobarbital is almost invariably given by mouth, other routes of administration have been tried. In 1922 Tomesco and Constantinesco[10] injected sodium luminal into the subarachnoid space, and in 1926 Ayola[10] injected the drug into the cisterna magna. However, these procedures resulted in so much meningeal irritation that they are not recommended by these authors. Sodium luminal can be used intravenously with good effect in status epilepticus. I have combined this form of administration with spinal drainage in a sufficient number of cases to lead me to adopt it as a routine procedure in this condition.

From the standpoint of diet, Wilder's[19] ketogenic diet is probably the most important contribution of the century. Wilder devised a diet on which it is possible to maintain ketosis for a considerable length of time. At first it was thought that the benefits were due to the anesthetic effect of the acetone bodies on the cerebral cortex. Later on, dehydration resulting from the acidosis was held responsible for the decrease in seizures, and more recently it has been found that the acetone bodies have anti-convulsant properties similar to those of phenobarbital but without the soporific effect. As yet, however, there is no uniform agreement on the *modus operandi* of the ketogenic diet.

In the past few years the physio-chemical approach to the riddle of epilepsy has been emphasized. Disturbances of the cellular physiology of the brain have been suspected and many investigations carried out along this line. In 1929 Fay[6] concluded that in a certain number of cases of epilepsy there is an excessive accumulation of fluid over the cerebral cortex, *i.e.*, a chronic external hydrocephalus which results in cortical atrophy. He based these conclusions on encephalographic studies together with certain others of a microscopic nature in fifty-nine patients suffering from convulsions. He advocated marked restriction of the fluid intake of epileptics, and in a large series so treated secured either disappearance or marked decrease in the frequency and severity of the fits. We now are advising fluid restriction in practically all of our epileptics.

More recent workers have favored the physio-chemical rather than the purely mechanical explanation of the beneficial effects of fluid restriction in epilepsy. McQuarrie[12] and his associates

suggest that in epilepsy there is a disturbance in equilibrium between the extracellular and intracellular fluids in the brain and attributes this disturbance to a change in the permeability of the cell membrane permitting hydration and an alteration in the colloidal state of the intracellular proteins. Along with this condition there also is a disturbed mineral balance, particularly with regard to the potassium and sodium ratio. During the convulsive state there is an excess of potassium in the urine as compared to the amount of sodium. McQuarrie has shown that this potassium probably comes from the nerve cell itself, the cell membrane no longer acting as a barrier because of its altered permeability and in that way permitting a "leakage" of potassium ions.

Because epileptic children are benefited by a ketogenic diet or by fasting, *i.e.*, procedures which are known to affect the level of the various blood lipids, McQuarrie[11] and his group also studied the blood lipids in epileptic children and found that, while there was no significant change in the cholesterol values, there was a definite lowering of the mean value for lecithin and a raising of the total fatty acid values. Furthermore, he found that in epileptics there was a greater variability of the phospholipid and total fatty acid values. Inasmuch as these substances are important constituents of the nerve cell membranes, these findings are significant in view of the presumed alteration in the permeability of the membranes.

McQuarrie et al. have also performed clinical experiments which substantiate Fay's original observations on the effect of fluid restriction in epilepsy. They induced changes in the state of hydration of the body by various procedures, and found that the establishment of a positive water balance was regularly followed in epileptic children by convulsive seizures, except when the patient was receiving anti-convulsant drugs (phenobarbital). If water retention was prevented by active diuresis or catharsis, high water intake did not necessarily produce convulsions.

From a consideration of the foregoing review, which has necessarily been sketchy, one is impressed by the kaleidoscopic panorama that epilepsy presents when viewed through the centuries of man's progress. Between the time of Hippocrates and that of Sir William Gowers a great many changes occurred in ideas, both as to the causes of epilepsy and also its treatment. I feel that Gowers sounded the beginning of modern thought on epilepsy when in 1881 he wrote, "Epilepsy is a disease of gray matter and it has not any uniform seat. It is a disease of tissue, not of structure." Compare this statement made by Lennox and Cobb[10] a half century later! "There is no constant anatomical lesion in epilepsy, and only a minority of patients with extensive cerebral pathology have fits. We are forced, then, to postulate some unknown constitutional element." Probably this element is the altered permeability of the cell membrane!

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HOW ONE LEARNS TO WRITE*

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I KNOW it doesn't do very much good to talk to you about the general principles governing writing because most of you need and want practical advice. I feel I am very much in the position of the preacher as described by Dean Swift in his *Argument Against Abolishing Christianity*. "It is a very absurd and ridiculous custom that a set of men should be suffered, much less employed and hired, to bawl one day in seven against the methods which are the constant practice of all men alive on the other six." That is exactly what I am doing—"bawling" against the methods you all employ during the other eleven months, thirty days, and twenty-three and one-half hours of the year.

If I had had longer notice or an invitation further in advance of this meeting I should have brought in some clinical material. On Tuesday, Dr. Olson asked me if I would talk to you tonight; and today is Thursday. I immediately asked men who I knew wrote medical papers if they would turn over to me some unpublished manuscripts which I could use for illustrative material. For some strange reason they all refused.

What I have to say is not intended to discourage any of you from attempting to write. Writing is, for anybody, even for a professional who writes most of the time—except the newspaperman who falls into a routine—ordinarily a very difficult thing. The reason men who write seldom write no better than they do is that they do not realize what a terrifically hard job writing is. As Dr. Bulkley has told you, I have written several books; I write a good many articles, but I find that the longer I write the more critical I am of the result. A great deal of the bad writing that is done may be explained by the fact that men do not realize how much intense effort and how much prolonged application is really required for the production of any kind of finished product.

The first requisite, if anyone is going to write, is that he shall have something to say. Most people think that Professors of English are rather "old-maidish," that they are so concerned with the proper use of words, the proper placing of commas, etc., that they forget all about ideas. I am somewhat heretical among teachers of English because I have always insisted that the first and most important element in composition is the idea. I should much rather listen to a man no matter how illiterate he may be, if he is intelligent and has an idea, than to one who conforms to all the rules of English, who has a beautiful voice but who has not an idea in his head. I should rather read a poorly written book, provided it contains food for thought, than a beautifully written one that has no appeal to the intelligence.

When Dr. Olson asked me to talk to you I supposed that I should not have to mention at all this fundamental necessity of ideas, because I assumed that anyone who sat down to write an article for a medical journal did so because he was convinced that he had something to say. But immediately after Dr. Olson asked me on Tuesday to talk to you, I went over to a dinner club to which I belong. There were two or three surgeons there, and I said: "I have a very difficult job before me and one which, if I had had time to reflect, I should never have undertaken. I am going to talk to the Minneapolis Surgical Society about writing. What shall I tell them?" One man said: "Tell them to have an idea. That is the trouble with most of their articles, they haven't any ideas." Later, another man came in, a man who has a great deal to do with graduate work in Medicine. He said: "Tell them to have a point and to get to it some time."

Now, gentlemen, nobody (particularly a Professor of English) can furnish you with ideas, but there is one thing I want to emphasize in the beginning so that as I go on to talk about the other things of which I am competent to speak, namely, the form and the order of the ideas you may have, you shall not lose sight of this important fact and get a wrong impression of what I consider to be good writing. Personally, I

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should rather know an untrained man of intelligence, good character and real kindliness than a man whose manners are perfect but who is an unintelligent nonentity. The one may offend by his bad manners but the other bores me. Personally, I would much rather be offended than bored. When I pick up an article which offends me, provided there is something real there, I go on and read it through, though I deplore the fact that the man has not had the necessary education and training, or, what I think is more often the case, has been unwilling to devote the labor and the time necessary to put the manuscript into shape.

No good writer that I know writes easily. Writing is not done without effort. That is why so many people say they write with their own blood. Five hundred words a day of a finished product is rather speedy composition. Those of you who sit down and dash off an article in a half day or an evening have not written an article; you have only made the first rough draft of it.

As I have said, I was unable to get hold of a manuscript to bring here in order that I might go over it with you, pointing out what I considered to be its virtues, its defects and the methods by which it might be improved. Lacking such material, I asked Dr. Olson for some copies of medical journals. The first one he handed me was an old number of MINNESOTA MEDICINE, the contents of which I hope most of you have forgotten if you ever read it. I opened it to the "Table of Contents" and then turned to the one article which I thought I might be able to understand, "The Status of Tinted Lenses," by a Minneapolis ophthalmologist.

You can see therefore that I have not chosen this article as a horrible example. In many ways it is well written. So far as my limited knowledge of medicine permits me to judge, I should say that it is distinctly above the average. But it does exemplify what about 90 per cent of all writing represents; namely, the first draft, and merely the first draft, of a finished product.

The writer of this article has an idea that he wishes to present; namely, that tinted lenses are being prescribed in a haphazard manner and that in many cases this use is detrimental rather than beneficial. That the article is timely is proved by the fact that a Minneapolis supply house has a full page advertisement of tinted lenses in the front of this same issue. The chief defect of the paper is that the writer has failed to work out a definite logical plan for the presentation of his ideas before writing or has failed to revise in accordance with such a plan after his first draft.

After reading the article several times I have elicited the following as the principal points which he wished to bring out:

1. Tinted lenses are being prescribed in an aimless and indiscriminating manner.
2. In most cases these tinted lenses are unnecessary, because nature furnishes protection against excessive ultra-violet rays and excessive heat.
3. The use of these tinted lenses may be harmful because they interfere with the natural process of adaptation of the eyes to varying conditions of light.
4. The ophthalmologist may be justified in prescribing them for people subjected to unusual conditions such as high altitude, where sunlight is intense, or snowfields or water where there is a great deal of reflected light.
5. Experiments have been made to determine the color of lenses which is most efficient in any given set of conditions, so that haphazard prescription is unjustified.
6. A summary of these points and the conclusions drawn from them.

This is a logical and orderly summary of the article—at least from a layman's point of view. The trouble is that the writer has taken these points up more or less together, that he does not finish with one idea before he passes on to the next and hence has to return to it again. Instead of orderly progress in a fairly straight line toward some definite preconceived goal, the path of thought is like that of a hunting dog quartering a field.

Many people are of course unable to think out a subject and make a plan before beginning the actual process of writing. They have to think on paper. In my own case, the first draft of anything I write is merely a preliminary thinking of the subject to discover for myself what ideas I may have on it. I regard this first draft as so tentative that I can scarcely write except with a pencil. Ink has something of the fixity and permanency of print, and does not permit as easily of erasures and insertions.

The writer of the article in question has thought out his subject, he has got his ideas down

on paper. This is the point at which *composition* in the true sense of the word should begin. He should have gone through his paper, playing with his ideas as he would with the pieces of a cross-word puzzle. The study of an unfinished manuscript to see how it can be re-arranged, what new combinations can be effected, what needs elaboration and emphasis, what toning down can be made is a fascinating intellectual pastime. My own first draft of a paper may be a badly scrambled mass of ideas. I renumber the pages, renumber the paragraphs, renumber the sentences within the paragraphs, turn the sentences inside out and other end to until I get something that at least approximates what I wish to say.

This is the only practical method I know about of teaching people to write. Most people consider anything that they have once written to be as fixed, unalterable, unyielding, as though their ideas had been cast in iron. They do not know what to do with it except to throw it into the waste basket and then begin all over again. Instead of being master of their own ideas, they are mastered by them. They should work with their material as a sculptor does with his model, conscious that it is plastic and susceptible of almost infinite possibilities of change until it is cast in iron or bronze. No statement is unalterable or irrevocable until it appears in print.

Let us suppose that by the methods I have suggested you have worked out some orderly plan for your article. Any one with a logical mind can work out some reasonable outline. More than almost any other men I know, surgeons with their knowledge of anatomy and their constant training in systematic procedure in operations should be expected instinctively to think and write in a coherent sequence. Now you know what it is that you intended to say, or toward which you were instinctively groping in your thinking out of your subject on paper.

The next step is to read over what you have written and find out whether or not you have said it. The result is most often a vague feeling of dissatisfaction. You know that you haven't done the job you set out to do, but you cannot find out exactly why not. You don't know what to do to improve what lies before you. What I would advise then is that you make a summary of your own article. Try to sum up each paragraph in a single sentence. If your article contains twenty paragraphs, you will have the same number of sentences. Read them over and see if they proceed in any definite sequence and if taken together they make sense. This is one of the simplest devices I know and one which anyone can apply to any composition, provided—and, of course, here is the catch—it is written in paragraphs.

What is a paragraph? Most writers think they have to break up a page about every so often, just as every so often they have to throw in a few commas or periods. They know it is done, and the manuscript looks better if it is done. Consequently, they put a break on the page and call the space between the breaks a paragraph. A paragraph is nothing more than an emphatic mark of punctuation, indicating to the reader that a group of sentences is to be taken collectively as the development of a single idea. You are supposed to have the development of one idea and only one idea in a paragraph. In a well written article or book, for example, you can go through and read the first and last sentences of each paragraph and get a complete summary of it. That is what a paragraph is; the development or enlargement of a single idea. Let me read a paragraph from this article, or a part of one:

> "The self-evident fact that colored lenses cut down the intensity or brightness of light of necessity raises the question whether this decrease of luminosity is harmful or beneficial."

The rest of the paragraph is a quotation from some authority, and is summed up in this way: "The effect of increased intensity is to speed up clear seeing, lessen fatigue, and prevent ocular discomforts." The first sentence of the paragraph leads you to believe there is a very important question, whether tinted lenses are harmful or beneficial. Apparently there isn't any question at all; or at least it is entirely one-sided.

He goes on, developing his idea very clearly until he gets about half way through the next paragraph:

> "In myopes and hyperopes there is an abnormal relation for accommodation and convergence. In these the strain of attempting to see clearly is much reduced by high intensities of light. It is not, then, the brightness of light which produces the asthenopic symptoms, but it is the faulty lighting arrangements, which cause a faulty distribution of light. Instead of lowering the brightness, more attention must be paid toward effecting a proper distribution. This entails, first, the elimination of unevenness of illumination, which produces

glaring and brilliant surfaces; second, the proper diffusion of light; third, careful attention to the angle of incidence; and, fourth, elimination of high brilliancies in the field of view."

The symptoms he brings in here have never been mentioned at all. It is entirely a new aspect of the subject that there are people who have asthenopic symptoms under very bright light; that these are not caused by the light itself but by improper illumination and this must be taken care of. He had jumbled up into one paragraph three ideas, and in order to get the ideas you have to do the work which he should have done for you. This is bad writing, not because the writer has nothing to say, but because he has been unwilling to do the necessary amount of labor to make good writing out of it. I have a number of illustrations from this one issue of MINNESOTA MEDICINE of this sort of thing.

Suppose you have the outline, suppose you have the paragraphs, the next thing is to consider the individual sentences. The type of a sentence that a person writes is one that sounds all right to him, and he lets it go. For example, here is one of mine which has been in print for about seven years.

"Although these two seem to have little direct connection with each other, they are but two aspects of one movement, the democratization of literature, first through a great increase in the reading public by an extension downwards that brought in an entirely new class of readers, second through an extension of the subject matter to bring it to the level of the experience and interests of the new readers."

I read it on Wednesday and said: "What does it mean?" There is no trouble with the grammar, but it is just a lot of words thrown together. It doesn't mean anything.

I am sure Dr. Olson won't object if I read a sentence from the program for this evening:

"Special Notice. Due to the quarantine of the Minneapolis General Hospital the following program will supplant the notice just received."

What does this mean? "Due to the quarantine the following program . . ." The program was not caused by the quarantine, or at least I hope it wasn't. That sort of slip occurs constantly. What is the meaning of the word *due*? *"Due to* prolonged exposure, the patient suffered such and such a disease." Gentlemen, as doctors, you know that the patient was not due to exposure; he was due to certain inadvertences on the part of his parents.

After you have gone through the article, have made the plan for its organization, have scrutinized the paragraphs, you have to go through it sentence by sentence and see if each sentence means something. Here is a sentence from this article:

"It is true that this radiation in sufficient concentration has a decided injurious effect upon certain structures of the eye, as has been amply proved by clinical observation and experiment, and even in the concentration present in the solar radiation a few isolated instances of injury have been reported, as in the case described by Syme where a woman developed an erythematous rash and injection of her eyes on a bright summer day (Duke Elder explains this by a sensitizer in the blood); but for the vast majority, nature has provided abundant protection against the ultraviolet ray."

Do you know what that means? You would not if you had the manuscript before you.

I will turn to the address of the President of the Minnesota Medical Association and read one of his sentences. He is talking about the charges brought against the medical profession. Here is one of his sentences:

"Reference is made to the group whose earnings do not exceed $2,500 per annum and does not consider the indigent."

What does it mean? "Reference, . . . does not consider the indigent." When you get right down to basic considerations, good writing is dependent on clear thinking. You don't need to know anything about grammar, and you don't need to know anything about punctuation. Most bad writing is the result of muddleheadedness. It is bad thinking. For most people writing is thinking on paper; and they do not take the time to make a careful analysis, and to revise their work as good writers do.

Here is another sentence:

"Their destructive criticism succeeded in working a great deal of serious inconvenience to the business methods of that time, but the ultimate result was to popularize still greater business combinations and the muck-raker was thereby out of a job."

You have got to pause after the word "combinations," otherwise you get a diametrically opposite idea from that intended by the writer. It is only a slovenly writer who misleads you in this way.

Here is no question of grammar but of common sense.

I could go on indefinitely talking to you about things of this sort, but I want to close by pointing out to you what seem to me to be the most important reasons most of us are not better writers than we are. First, writing is hard work. I dread it. I really suffer when I have to write a book. I go to my desk and sit down, and I labor as I never labor at any other time in my life. It is hard, and only by hard, persistent application is anything produced that gives any sense of satisfaction at all. Because it is such hard work most of us shirk it, avoid it. We do not write any oftener than we have to; only when we are compelled to write, do we write.

The second reason we are such bad writers is the one I have already mentioned; we regard anything put down on paper by pen or anything else, as something cast, something we cannot do anything with except re-cast. The first form of anything should be more or less tentative. Get the idea of playing with a sentence, turning it inside out, putting what is last first, or making the middle the beginning, what is the principal clause of it, the subordinate clause. See how many different ways you can say the same thing until you find one way which is the most effective. That is real practice in the art of writing.

The third reason is that we all fall into more or less stereotyped habits of expression. In our dictation, we say—"Yours of the 10th received" —and so on. We do not make any effort to put originality into our speech, into our dictation, or even into the writing of our personal letters. We avoid, as far as possible, all of the opportunities presented to us in ordinary conversation, in the writing of personal letters, in the dictation of business letters, to improve ourselves in this, the most important of all our faculties.

I want to leave with you in parting Boswell's account of the manner in which Johnson acquired that facility in and that mastery of the English language for which he became famous. Dr. Johnson is an outstanding exception to nearly everything that I have said. Yet I consider the example which he set as the one which you should bear constantly in mind.

"Posterity will be astonished when they are told, upon the authority of Johnson himself, that many of these discourses, which we should suppose had been laboured with all the slow attention of literary leisure, were written in haste as the moment pressed, without even being read over by him before they were printed. It can be accounted for only in this way; that by reading and meditation, and a very close inspection of life, he had accumulated a great fund of miscellaneous knowledge, which, by a peculiar promptitude of mind, was ever ready at his call, and which he had constantly accustomed himself to clothe in the most apt and energetic expression. Sir Joshua Reynolds once asked him by what means he had attained his extraordinary accuracy and flow of language. He told him that he had early laid it down as a fixed rule to do his best on every occasion, and in every company: to impart whatever he knew in the most forcible language he could put it in; and that by constant practice, and never suffering any careless expressions to escape him, or attempting to deliver his thoughts without arranging them in the clearest manner, it became habitual to him. . . ."

When we sit down to write we are doing something that is wholly foreign to our ordinary habits. We have got to get away from that if we are ever going to learn to write.

INTRAVENOUS USE OF BARBITAL COMPOUNDS (II).

The Council on Pharmacy and Chemistry reports that in 1931 it decided on definite limitations for the intravenous use of barbital compounds for induction of anesthesia and sponsored the following statement: "Their intravenous use should be limited for the present to conditions in which oral administration is not feasible either because the patient is unconscious, as in cerebral hemorrhage, eclampsia, or status epilepticus, or because he resists, as in delirium, or because a very prompt action is imperative, as in convulsion from local anesthesia." In the consideration of sodium amytal and the brands of pentobarbital sodium, the Council recognized that these drugs might be administered intravenously in the conditions mentioned in its report and laid down certain stipulations with regard to propaganda for their intravenous use. In the recent consideration of Pernoston, a barbituric acid derivative marketed only in injectable form, the question was raised as to whether or not in the light of accumulated experience it was desirable to relax the limitations which the Council had placed on the intravenous use of barbital compounds. A questionnaire was sent to a selected list of surgeons, anesthetists and others asking whether they considered that the time had arrived when the Council should agree to the advertising of preparations of soluble barbiturates for intravenous injection for induction of anesthesia. The Council has given careful consideration to the replies to the questionnaire, and it believes that the evidence overwhelmingly sustains its previous conclusion concerning the limitations for the use of the soluble barbiturates in the induction of anesthesia. The Council therefore has reaffirmed its previous decision with reference to the advertising of these substances. (Jour. A. M. A., July 15, 1933, p. 208.)

PROGRESS IN THE TREATMENT OF CARCINOMA OF THE STOMACH*

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THE introductory paragraphs in a recent monograph on cancer of the stomach by Balfour and Gray forcibly state the importance of early recognition of this condition: "The seriousness of cancer of the stomach cannot be overstated, since in the majority of cases encountered by the surgeon the disease is too far advanced to permit complete removal of the involved tissue; every effort should be made to detect the lesion while it may still be possible to remove it." It cannot be too strongly emphasized that such removal may bring about temporary or permanent results that are unexpected. Even a definite percentage of cures will follow.

During the past year the progress which has been made in the treatment of carcinoma of the stomach can be attributed to, first, the increasing efficiency with which the competent roentgenologist can identify even the smallest gastric lesion, and second, extension of the field of operability to include extensive carcinomas of the stomach, which heretofore might have been regarded as being on the borderline of operability, or even roentgenographically inoperable or unremovable.

The value of roentgenographic examination in cases of early carcinoma of the stomach was strikingly illustrated in two cases which recently came under my observation. In the first case, the presence of a small carcinomatous, ulcerating lesion, measuring 1.9 by 1.7 cm., was detected by the roentgenologist, was found at operation, and was successfully removed by gastric resection. The pathologist confirmed the diagnosis of malignancy. In the second case, that of a man aged thirty-two years, the roentgenologist had made a pre-operative diagnosis of a small, ulcerating, malignant lesion of the lesser curvature of the stomach. At operation, with the lesion between my exploring fingers, I felt that it was the result of an inflammatory reaction. The distal half of the stomach, and the duodenum, were removed because of uncertainty concerning the nature of the lesion, and the pathologist reported it to be an adenocarcinoma, graded 2. Last week I operated on a patient who had a small, recurring ulcer of the lesser curvature of the stomach, two years after reported local excision of a gastric ulcer. Recurrence of the symptoms associated with pylorospasm had occurred. The roentgenologist reported a gastric ulcer with a small crater. At operation, the lesion appeared grossly to be a benign gastric ulcer, with a round, smooth crater approximately 1 cm. in diameter. Because of the history of recurring ulcer and the associated pylorospasm, gastric resection was performed, cutting well beyond the lesion, using the Billroth I-Haberer anastomosis between the stomach and the second portion of the duodenum to restore continuity. Although, on gross examination, the lesion appeared to be benign, a few minutes later a report of microscopic examination was that the lesion was a carcinoma.

In the first two of these cases the roentgenologist was correct in his declaration that the lesions were malignant, whereas in the third case the possibility of the lesion being malignant was not suspected until microscopic examination had revealed its presence. I believe the statement is justified that the report of a malignant lesion of the stomach, made by a competent roentgenologist, is almost certain to be accurate, but the report of a gastric ulcer made by a roentgenologist or even by a surgeon who actually sees the tissue at the time of operation, does not exclude the possibility that the lesion may be carcinomatous.

I should like to emphasize the point that small, ulcerating lesions of the stomach may be carcinomas. McVicar called attention, several years ago, to the fact that an ulcerating lesion of the stomach which disappears following a course of medical treatment cannot always be assumed to be benign, for he found that many patients with ulcerating lesions of the stomach may respond temporarily to medical treatment even when the process is malignant. To consider such disappearance of a lesion as a criterion that it is benign, may cause delay in attacking the lesion surgically, and may allow an operable lesion to

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Inter-State Postgraduate Medical Association of North America, Cleveland, Ohio, October 16 to 21, 1933.

proceed to inoperability. There is no doubt that medical treatment of many benign gastric ulcers by internists skilled in treatment of gastro-intestinal disease is worthy of trial for certain types of gastric ulcer, particularly when acute and the patient is young. This treatment should be attempted only when the patient can be kept under observation for several months. It should be emphasized that the decision to treat such a person by medical measures carries a great responsibility, for if the lesion is malignant by the time it is found to respond unsatisfactorily to medical treatment, sufficient time may have elapsed for it to have become unremovable. I vividly recall one patient with a gastric ulcer who was being treated medically. Pain was relieved, blood disappeared from the stools, and the niche disappeared on roentgenologic examination. Ten months later, however, symptoms reappeared. The roentgenogram revealed the lesion, exploration was made, and an extensive inoperable malignant lesion was found from which the patient died a few months later.

Curability of Carcinoma of the Stomach

A recent study by Gray, of a series of 373 patients who had undergone resection for carcinoma of the stomach in The Mayo Clinic, disclosed that the three most important factors in decreasing the possibility of a long postoperative life are lymphatic involvement, serosal involvement and a tumor of a high grade of malignancy. Further, the incidence of lymphatic involvement increased in direct proportion to the increase in the severity of the malignant process, as indicated by Broders' index of malignancy. This study serves to explain the fact that in 1,000 consecutive cases of carcinoma of the stomach reported by Balfour, for which operation was performed at the clinic, 52 per cent of the patients whose lymph nodes were not involved at the time of operation were alive at the end of three years. Of those whose lymph nodes were involved, only 19 per cent survived that length of time. This statement should not be construed, however, to mean that the presence of involved lymph nodes is a contraindication to operation, for enlargement of the lymph nodes along the curvatures of the stomach does not necessarily mean involvement by carcinoma, for microscopic examination of many of these lymph nodes will show them to be enlarged from inflammation, and to contain no cells of carcinoma. In either event, complete removal of all enlarged lymph nodes in the gastrohepatic omentum along the lesser curvature of the stomach, as well as those along the greater curvature of the stomach at the time the resection is done, is the advisable procedure.

If further progress is to be made, therefore, in securing a larger proportion of three and five year cures in cases of carcinoma of the stomach, every effort must be made to recognize the presence of gastric lesions in their earliest stages. Although the symptoms, signs, and course of the disease are dependent in large measure on the situation, extent, and size of the growth, it might be said in general that the most important and most frequently occurring symptom is persistent dyspeptic discomfort. In some cases symptoms suggestive of an ulcer may have been present for years; later, and this is suggestive of malignant degeneration, the symptoms may change in character. One such change may be that methods which previously had been effectual against pain, fail. A relatively small number of patients have mild, irregular indigestion, sometimes the result of a diseased appendix or gallbladder, and the change of symptoms that might be suggestive of malignant degeneration is so insidious that the patient is without knowledge of the change. The presence of gastric lesions producing obstruction and hemorrhage is readily recognized.

Since carcinoma of the stomach can be detected by a competent roentgenologist in 95 per cent of all cases it should be emphasized that such an examination of the stomach of patients forty years of age or more, who have indeterminate dyspepsia, is a most important procedure. It should never be omitted in any suspicious case.

Reference has been made to the difficulty of determining the exact nature, before microscopic examination, of an ulcerating lesion of the stomach. In addition to carcinoma and ulcer of the stomach, relatively few other gastric lesions occur with any degree of frequency. They are gastric polyps, lymphosarcomas, and syphilitic lesions of the stomach. All of these lesions occur in the proportion of less than 1:100 in comparison with carcinomas. Masson found that, at the clinic, the proportion of sarcomas to carcinomas was 1:159, whereas gastric polyps occurred with even less comparative frequency. The malignant potentialities of all polyps of the

stomach parallel those of polyps of the colon. Therefore, the periphery of a polyp, as well as its pedicle, should be carefully examined at the time of its removal to ascertain the presence or absence of malignant cells. In a pathologic study of five recent cases in which gastric polyps had been removed, McRoberts found that in four of the polyps there was secondary cytoplasia at the periphery. In larger gastric polyps, the probability of malignant degeneration makes partial gastrectomy advisable.

While considering gastric polyps, attention should be directed to the fact that a large polypoid tumor of the stomach may be attached by a narrow pedicle, and yet, on roentgenologic examination, may so displace the barium as to lead to the impression that an extensive, malignant lesion is present. If the pedicle is short and the polyp lies in the upper part of the stomach, the erroneous conclusion is reached that an inoperable lesion is present, whereas easy access to the tumor can be gained by the transgastric approach. Further tending to obscure the diagnosis is the fact that in almost all cases of gastric polyp, when complicated by other gastric lesions, free hydrochloric acid is not found in the gastric content.

Surgical Treatment

It has been the custom at the clinic to advise exploration in cases of carcinoma of the stomach, unless unremovable, metastatic growths have been proved to exist. The rationale of such a decision rests on the basis that occasionally roentgenograms will give evidence that a lesion is of greater extent than it really is, and frequently the stomach is found to be unusually movable, a circumstance which makes any localized gastric carcinoma suitable for removal. Occasionally a diseased and distended gallbladder, or distention of the splenic flexure of the colon from gas, or the presence of other lesions in adjacent viscera, such as pancreatic cysts, may so interfere with the neuromuscular activity of the stomach that apparent defects in outline, suggestive of carcinoma, manifest themselves. When such disturbances involve the upper portion of the stomach, they may lead to the erroneous interpretation that the lesion is inoperable.

In the last few years, we have been able to remove an increased number of extensive malignant lesions of the stomach. This has been particularly due to the fact that a patient is always given the benefits of exploration and removal of the malignant gastric lesion if it is feasible to do so. In the last three years total gastrectomy has been perfomed at the clinic in seven cases. In November, 1932, two of these seven patients were living and well more than two years after operation, and one more than one year after operation. That such an operative procedure could be carried out in suitable cases with great benefit to the patient has led to the impression that gastric lesions should be considered removable unless they have invaded adjacent structures and thus could not be removed in their entirety. In many cases in which the lesion at first appears to be incapable of removal because of the extent of the growth, or because of its attachment to the mesocolon or capsule of the pancreas or liver, it is found that after the freeing of adhesions and the separation of the lesion from the structures, the growth can be removed. In other cases, particularly if the tumor is large, the uninvolved portion of the stomach may be thickened and give the appearance of involvement, although thickening may be only the result of gastritis adjacent to the lesion. Balfour has called attention to the fact that a gastric lesion examined while the patient is straining under light anesthesia may appear unremovable, but under deep anesthesia the lesion may be readily accessible.

The influence of age on operability.—On previous occasions, I have emphasized the fact that in the consideration of operability of any lesion, advanced age of the patient is no detriment to successful completion of an operative procedure, regardless of its magnitude. In other words, everything else being equal, it is not the patient's age but the patient's general condition which determines the operative risk of a given surgical procedure. The ability of elderly patients to withstand such procedures as extensive gastric resection is exemplified by one patient, aged sixty-nine years, on whom I performed successful total gastrectomy more than two years ago, and who was living and well at the age of seventy-two years. I have successfully performed extensive gastric resections for malignant lesions in the lower and middle thirds of the stomachs of many patients who were more than seventy-five years of age, and of one, recently, who was aged eighty years. In many such cases the value of a few days of preparation in the hospital, before the

operation, has been considerable. The impression is that gastric carcinoma of elderly patients manifests its presence when the growth is in a fairly early stage, but this impression may be accounted for by the fact that late in life growth of the malignant lesion appears to be much slower than might be expected; therefore, the symptoms may have been present for some time, but at exploration the growth is not far advanced. On microscopic examination, most of the malignant gastric lesions removed from elderly patients are of low degree of malignancy, and in most cases there is no involvement of lymph nodes; hence the prognosis as regards longevity is particularly good.

The palliative treatment of inoperable, malignant gastric lesions.—In considering the treatment of carcinoma of the breast, and its recurrence, Handley stressed the point that physicians must not be content to treat only the operable or curable cases of malignant disease, but that to employ any procedure which can be carried out for the patient with a recurring malignant lesion, or an inoperable malignant lesion, which will make the remainder of the patient's life more comfortable, is a duty. No better example can be found of the value of palliative measures than in surgical treatment of inoperable carcinomas of the stomach.

Removal of a necrotic, ulcerating, bleeding lesion of the stomach, even though metastasis may be present in the liver, is a palliative procedure worthy of consideration in dealing with a patient whose general condition warrants it. Similarly, in the presence of obstruction, gastro-enterostomy not only will bring relief of the distressing vomiting, but will enable the patient to take adequate nourishment, and these effects of the operation mean restoration of weight and improvement in general well-being. Mayo and Balfour both have directed attention to the fact that patients may live two, three and four years, in fairly good health, following palliative removal of a malignant lesion of the stomach, even if metastatic nodules are found in the liver at the time of the operation. Hepatic metastatic growths seldom become sites of infection.

An ideal method of palliation, if complete removal of the lesion is impossible, is exclusion of the growth. This is done by dividing the stomach above the lesion, and anastomosing the upper, uninvolved portion of the stomach to the jejunum. In cases in which palliative resection or gastro-enterostomy seems inadvisable, jejunostomy can be performed for feeding, and the patient's stomach can be kept empty subsequently by means of a stomach tube. Emphasis again should be placed on the fact that relief of symptoms and prolongation of life often can be afforded the patient with incurable carcinoma by treatment directed to these ends.

Summary

Carcinoma occurs more commonly in the stomach than in any other organ in the body and affects men three times more frequently than women. The symptom of common occurrence is persistent dyspeptic discomfort.

Carcinoma of the stomach can be detected by a competent roentgenologist in 95 per cent of cases, but the roentgenographic diagnosis of benign gastric ulcer does not exclude the possibility that the ulcer may be carcinomatous, nor does the diagnosis of benignancy on gross examination.

The prognosis in the surgical treatment of carcinoma of the stomach is dependent on the degree of malignancy of the lesion and on the presence of involvement of lymph nodes. In 1,000 consecutive cases in which carcinomas of the stomach were removed at The Mayo Clinic, three year cures were obtained in 52 per cent of the cases in which there was no involvement of lymph nodes, but in only 19 per cent of cases in which the lymph nodes were involved.

Exploration for every tumor of the stomach is indicated, provided the patient's general condition permits, and unless proof of unremovable metastatic growth exists.

Because many gastric ulcers are benign, many of them will heal under a proper medical regimen. The decision to treat such lesions medically, however, carries great responsibility. If the lesion is malignant, by the time it is found to respond unsatisfactorily to medical treatment, sufficient time may have elapsed for it to become inoperable. Medical treatment should be carried out with the patient in the hospital and under observation for several weeks, and frequent subsequent examinations of the stomach should be made. Even in cases in which excellent progress is made under medical care, the patients should be advised to return at frequent intervals for examination.

A gastric ulcer may be found to be malignant

on microscopic examination, even though it has all of the roentgenographic and grossly pathologic aspects of being benign.

The elderly patient with a malignant gastric ulcer should not be denied the benefits of operation. Successful, subtotal or total gastrectomy has been performed on patients who were between sixty-five and eighty years of age.

Palliative treatment of inoperable gastric tumors should be directed toward relief of pain and obstruction, and improvement in general condition. Removal of necrotic, ulcerating lesions is justifiable in selected cases even in the presence of hepatic metastasis. When removal is impossible, the exclusion operation of Balfour affords ideal palliation.

SACRO-ILIAC TUBERCULOSIS*

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TUBERCULOUS sacro-iliac disease has been encountered in 6 per cent of our series of orthopedic cases. The present discussion is a résumé of the treatment and results obtained.

Thirty-one patients with sacro-iliac disease have been treated at Glen Lake Sanatorium during the past ten years (Table I).

The right sacro-iliac joint was found involved in twelve instances, the left in sixteen, and both in three. Six patients presented posterior subcutaneous abscesses, one had a massive psoas abscess and in another a deep abscess had burrowed into the ischio-rectal fossa.

It is of interest to note that the lower portion of the joint was involved twenty-three times, the upper twice, and the entire joint six times.

Six patients in this group presented no other clinically demonstrable tuberculous lesion in either bone or viscera. However, in the remaining twenty-five, ten were afflicted with active pulmonary lesions, six had other bone lesions and nine had visceral and other bone lesions. The other bones and joints involved were the spine (10), hip (6), diaphysis of humerus (1), and sterno-clavicular articulation (1), while visceral lesions occurred in the lung (10), kidney (4), bowel (2), skin (1), lymph nodes (1), peritoneum (1), and larynx (1).

Diagnosis was made by history, physical signs, appearance of roentgenograms, examination of exudate and tissues from abscesses, and the existence of other proven tuberculous lesions elsewhere in the body.

All cases were treated by wholly conservative methods. Because of the existing visceral lesions, absolute bed rest and heliotherapy was indicated over a prolonged period. In twenty cases immobilization was required to maintain the proper orthopedic position and to relieve pain and muscle spasm. All abscesses were evacuated by wide incision and subsequently treated with

TABLE I. RESUME OF THIRTY-ONE CASES OF SACRO-ILIAC TUBERCULOSIS

Age — 11 to 70 - Average 31

Sex — 14 females - 17 males

Location — 12 Rt. - 16 Lt. - 3 Rt. & Lt.
— 18 lower 1/3 — 5 lower 2/3 — 6 entire.
1 upper 1/3 — 1 upper 2/3

Abscess — 6 posterior
1 psoas
1 ischio-rectal fossa

Other tuberculosis
— 6 no demonstrable lesion elsewhere.
25 — 18 visceral — kidney, pulmonary, bowel.
— 13 other bone — spine, hip, sternoclavicular.

Treatment
— Bed rest & heliotherapy - 31
— Traction - 13
— Casts - 4
— Belt - 3

Results
— 5 dead — pulmonary death 3
— peritonitis & adenitis 1
— amyloidosis & multiple abscesses 1
— 2 lost track of
— 7 improving in residence
— 17 well

Hospitalization
— 17 cases clinically well - average 891 days.

*From the Department of Surgery, University of Minnesota, Minneapolis, and Glen Lake Sanatorium, Oak Terrace, Minnesota. Read by invitation at the annual meeting of the Clinical Orthopedic Society, Minneapolis, November 11, 1933.

iodoform packs until closed by granulation tissue. No other surgical procedures were employed.

Five patients died under treatment, three of pulmonary lesions, one of peritonitis and adenitis, and one of amyloidosis and multiple abscesses. Two cases left the sanatorium after a few days, and have been lost, seven are improving under treatment, while seventeen have been discharged well. One of these seventeen died six years after discharge, of pulmonary and meningeal tuberculosis.

Fig. 1

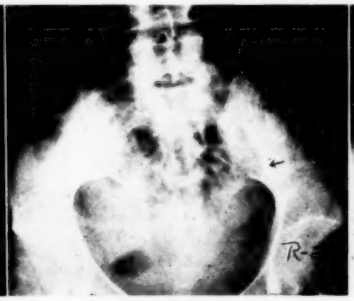

Fig. 2

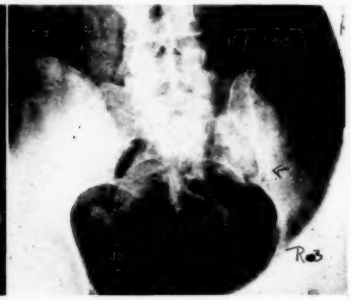

Fig. 3

Fig. 4.

Fig. 5.

For the seventeen cases discharged well, the average number of hospital days was 891 (509-1654). Thus almost two and a half years was spent in the conservative treatment of these sacro-iliac lesions. To the orthopedic surgeon this seems entirely unnecessary when he is able to fuse such joints by surgical means and return his patient to industry in a few months. However, this short period of hospitalization has been directed toward only one tuberculous lesion, while our figure shows the time necessary for treating a tuberculous individual. Surgical procedures of major importance have been carried out on these patients during their course of treatment, such as thoracoplasty, nephrectomy, radical operation for perirectal abscess, and the Henry fusion operation on the spine. From this, one can see that fusion operation on the sacro-iliac is entirely in order as far as surgical procedures in the tuberculous individual are concerned, but it has been our experience that the sacro-iliac lesions progress favorably while the other tuberculous lesions are being treated.

The final result is bone repair, and at least partial fusion of the diseased area in the sacro-iliac with complete return of normal body function.

It has been shown by us and other observers that fusion of a tuberculous joint does not mean absolute healing of the tuberculosis, although bony ankylosis does prevent recurrence. In this series there have been no recurrences over a period of three to six years.

The following two cases illustrate particularly the type of repair noted in these joints.

Case 1.—The patient, female, aged thirty-five, was admitted with pulmonary tuberculosis and tuberculosis of the right sacro-iliac joint. Figure 1 shows destruction

of the lower third of the joint on admission. The patient was treated by recumbency, traction and heliotherapy for one year. Figure 2 shows increased destruction under this treatment. Figure 3 shows sclerosis and new bone formation after four years of therapy for pulmonary and bone lesions.

Case 2.—A boy, aged fourteen, was admitted with tuberculosis of the right and left sacro-iliac joints, accompanied by an abscess draining over the right ilium. No other tuberculous focus was demonstrable. Figure 4 shows the destruction of both sacro-iliacs in their lower two-thirds. The patient was treated by recumbency, traction and heliotherapy. A guinea pig inoculated with material from the abscess developed tuberculosis. Figure 5 shows the return of contour and trabeculation in both joints after three years of treatment.

Conclusions

1. Tuberculosis attacks the lower portion of the sacro-iliac most frequently (75 per cent of our series).

2. The accompanying abscesses treated radically heal, and do not interfere with healing of the joint.

3. Of all tuberculous bone lesions 80 per cent are accompanied by visceral tuberculosis of one type or another.

4. Entirely conservative measures of therapy have given us 77 per cent clinical cures, with no recurrences, while 16 per cent of this group have died of progressive visceral tuberculosis.

5. Every surgeon should consider orthopedic tuberculous lesions from the standpoint of the specialist in tuberculosis, namely, that a tuberculous joint is practically always accompanied by tuberculosis in some other joint or viscus. These other foci may be healed, inactive, latent, or entirely undemonstrable, but until so proven the entire individual, and not just the joint in question, should be treated.

SELECTION AND PREPARATION OF PROSTATIC PATIENTS FOR OPERATION*

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THE chief problem of bladder neck obstruction is that of infection in the urinary tract. While it is debatable whether infection plays a role in the development of benign hypertrophy and of carcinoma of the prostate, there is no debate as to its part in the production of fatalities once bladder neck obstruction has developed, since autopsy studies show that bacterial inflammation of some type is responsible for most of them. The infection usually takes the form of an acute or chronic pyelonephritis but may also appear as pyogenic infections in or about the urethra, genitalia, or bladder, or as metastatic processes outside the urinary tract (peritonitis, pulmonary embolism, etc.). It is therefore clear that any plan of treatment of the obstructed urinary tract must take account of the great susceptibility of that tract to bacterial invasion.

Apart from the recognition of the various pathologic types of prostatic obstruction, and from improvements in the technic of their operative relief, the greatest single advance in the therapy of prostatism was undoubtedly the recognition of the necessity of preparing the patients for operation.

The Need for Preparation

This is based upon the well known fact that even partial retention of the urine increases the susceptibility of the whole urinary tract to infection, a fact which was observed clinically by Goodhart in 1874 and since verified experimentally by Melchior, Rovsing, and many others. Its mechanism is twofold.

First, the expulsion of urine through a partially obstructed urethra requires an increased intravesical pressure which, while probably intermittent in character, often rises above the venous pressure and so causes venous stasis, at first confined to the bladder and prostate, but later involving the ureters and kidneys. This stasis doubtless leads both to deficient oxygenation of the tissues and to an inadequate supply of white blood cells in the affected tissues, thus reducing local tissue resistance.

In the second place, the development of stag-

*From the Department of Surgery, the Medical School, Minneapolis, Elaboration of a paper on Sudden Decompression of the Bladder, presented at the meeting of the North Central Branch of the American Urological Association, Chicago, October 13, 1933.

nant residual urine in the bladder and the coincident slowing of the stream of urine in the renal pelvis and ureter further favor bacterial growth.

Another important predisposing factor is that of trauma, which has also been verified clinically and experimentally, and which is too often supplied by the catheter. Moreover, in a high percentage of cases, a chronic prostatitis is present and may supply the organisms for a fulminating infection in spite of the most scrupulous asepsis in catheterization, especially if trauma be inflicted. While the patient is usually more or less immune to his own organisms, the combination of retention and trauma may sufficiently reduce local resistance to make them deadly. An additional menace is the fact that the chill which may follow urethral manipulations in such circumstances is frequently associated with bacteriemia, an especially serious matter if venous stasis be present in the kidneys, since the consequent slowing of their circulation increases their exposure to the infecting agent. Thus certain patients with bladder neck obstruction are in a potentially precarious state so far as infection is concerned.

The Selection of Cases for Preparation

It goes without saying that it is desirable to have every patient in the best possible general condition, especially as concerns the circulatory system. In this, the coöperation of a capable internist is invaluable.

Granted that the patient's general condition is satisfactory, four questions concerning local conditions must be answered before operation may be undertaken:

1. What is the degree of urinary retention?
2. Is serious infection present?
3. Is the kidney function adequate to permit operation?
4. Are there local complications which may prevent or impair the result of operation?

1. *The Degree of Urinary Retention.* In the absence of a palpable bladder, this can be determined only by catheterization, which, in acute retention, is an emergency measure; in chronic retention it may be deferred until a convenient time. The importance of asepsis in catheterization is inestimable. A soft rubber catheter is best because it inflicts the least trauma. It should be thoroughly lubricated (by the injection of mucilage of tragacanth into the urethra in difficult cases), the urethral meatus prepared with alcohol, and the catheter passed with a sterile forceps.

It is impossible to discuss the catheterization of prostatics without mentioning the old hypothesis that the sudden relief of a long-standing urinary retention is dangerous. This idea was mentioned in the Ebers papyrus, rediscovered by the French and English urologists of 1845 to 1860, and brought forth again in this country with considerable fanfare in 1912 by Pilcher, and in 1920 by Van Zwalenburg. In brief, it depends upon the idea that sudden emptying of the chronically distended bladder causes a sudden fall in the intravesical tension, leading to venous stasis in the bladder and kidneys and later hemorrhages into them, with resultant oliguria, hypotension and death. However, it fails to take account of the following facts:

> (a) Spontaneous decompression probably occurs during the intervals between attempts to urinate; (b) the degree of retention which is supposed to require gradual emptying is not known; (c) nearly all patients dying after catheterization exhibit severe infections in the urinary tract; (d) infection can and does cause hematuria, hypotension, oliguria, renal insufficiency, and death; (e) comparison of similar series of cases shows that gradual emptying of the distended bladder does not lower the mortality which results from sudden emptying.

The writer has recently reviewed the evidence upon this point and has concluded that it makes no difference whether the bladder is emptied suddenly or rapidly, provided the catherization be sterile and gentle, and *provided that one then prevents redistention* either by frequent catheterization or by use of the inlying catheter. Redistention of an infected bladder is particularly likely to be disastrous because urgent attempts to void may cause such a pressure rise in the bladder as to cause venous stasis, hemorrhage and even necrosis of the mucosa, conditions which afford an extremely favorable culture medium for bacteria.

If catheterization is impossible it is worth knowing that local or regional anesthesia may make it very easy. If the urethra has not been traumatized at all, *and then only*, the gentle injection of 20 cubic centimeters of freshly mixed one per cent cocaine with an urethral syringe and its retention for five minutes may be tried.

The presence of bleeding absolutely contraindicates the use of cocaine. If cocaine cannot be used, or if it fails, caudal anesthesia (30 to 45 cubic centimeters of two per cent novocaine) may be of great assistance. Since adopting these methods ten months ago the author has used cystostomy but once because of inability to catheterize a patient.

2. *Infection.* Having determined the amount of residual urine, the next step is determination of the presence or absence of infection within the urinary tract. If acute infection with fever is present, continuous catheter drainage with forced fluids (3000 to 5000 centimeters daily if well borne by the heart), bed rest, and urinary antiseptics are required. Failure to respond to these measures may require cystostomy to get rid of the irritative effect of the inlying catheter with its attendant absorption from the urethra.

Chronic infections are similarly treated with the addition of bladder lavage and of the ketogenic diet in suitable cases. Not infrequently it may be necessary to operate in the presence of a resistant chronic infection. If the patient is well-immunized as shown by the absence of a febrile reaction during the preparatory period, it may safely be disregarded, if, as will be pointed out later, certain precautions are taken.

3. *Kidney Function.* The next concern is for the renal function, which is most easily estimated by means of the fractional phenolsulphonephthalein test.* The objective of the drainage period should be to get the dye excretion as nearly normal as possible, which may require a few days or several months. Operation may be done when the excretion has reached a constant level.

4. *Local complications* are of two types: those which interfere with preparation, and those which may impair the result of the operative treatment. Acute prostatitis, urethritis, or periurethral abscess may subside under conservative treatment or may demand removal of the catheter, cystostomy, and corrective operation. If the drainage period seems likely to be long, vasectomy is desirable as a preventive of epididymitis.

Those complications which may impair the end-result consist chiefly of stone, bladder tumor or diverticulum, and of those lesions which lessen the bladder's expulsive force (atony of the wall, tabes dorsalis). Stones are best excluded by x-ray; when present they can usually be removed by litholapaxy unless too large or too hard, when they may require suprapubic cystotomy, a procedure which decreases in frequency with an increasing experience in instrumentation.

Diverticula are readily recognized by x-rays made after distention of the bladder with warm, sterile, five per cent emulsion of silver iodide. If small they may be disregarded; those of moderate size may be left for later operation if required, since they may disappear or at least give no trouble with adequate relief of obstruction; large sacs require preliminary diverticulectomy to avoid persistence of retention, infection, and urinary symptoms.

In general, those diverticula which empty during catheterization of the bladder (but not of the diverticulum itself) may be left untreated.

A history of spontaneous hematuria demands a thorough, painstaking cystoscopic examination including retrograde or intravenous pyelograms to exclude vesical and renal neoplasms, especially since the latter often present the clinical picture of urinary retention due to clots. The preliminary cystogram is of value in demonstrating bladder tumors, but it must be remembered that while large neoplasms may produce characteristic filling defects, small ones may fail to do so.

Atony of the bladder wall is usually due to long-standing overdistention with atrophy or fibrosis of the detrusor muscle.

It is recognized by the fact that the urine, even in acute retention, drips from the catheter instead of issuing forcefully from it. It may also be recognized from the fact that the bladder is unduly large and has a characteristically flaccid appearance in the cystogram. This type of cystogram usually shows advanced trabeculation, cellule, and even diverticulum formation. The presence of atony is an indication for long-continued preliminary drainage since, if the bladder wall is flaccid, it will fail to empty after removal of the prostate. In late cases recovery will not occur because of fibrosis of the detrusor muscle, which cannot, therefore, recover its elasticity. These are happily rare. In doubtful cases it is desirable to relieve the obstruction, especially if this can be done endoscopically, resorting to prolonged suprapubic drainage if this fails.

*Six milligrams intravenously, four specimens at half hour intervals, using an inlying catheter and estimating the percentage elimination in each period. The minimum normal is 40 per cent with nearly half the total appearing in the first half hour.

Lesions which impair the expulsive force of the bladder via the nervous system and which appear at the prostatic age consist chiefly of tabes dorsalis, taboparesis, and arteriosclerosis of the spinal cord. While incontinence of urine, either true or paradoxical, is often a symptom of spinal cord lesions, it may be absent. Cord lesions are also to be suspected whenever the expulsive force is poor. Either of these symptoms is an indication for a careful neurological and cystoscopic examination, at which one may observe one or more of the cardinal signs of neurogenic dysfunction of the bladder, namely, relaxation of the internal sphincter, fine trabeculation (as opposed to the coarse trabeculation of the purely obstructive lesion), diminution in expulsive force, and loss of sensation. The presence of such disturbances in robust individuals with prostatic obstruction need not contraindicate its operative relief unless a true incontinence be present or unless there be complete loss of sensation. It is to be remembered that spinal cord lesions lead primarily to loss of expulsive force, so that a prostatic hypertrophy or fibrosis of insufficient degree to cause obstruction in an otherwise normal individual may cause complete retention in the tabetic. Thus, in properly selected cases, transurethral resection may be carried out with every expectation of success. The preparation does not differ materially from that in ordinary bladder neck obstruction.

The Indications for Cystostomy

With the increasing adoption of transurethral resection, the need for preliminary cystostomy in lieu of catheter drainage has been much diminished, chiefly because the period of drainage and thereby the quantitative exposure of the urethra to infection and irritation by the inlying catheter are reduced, thus diminishing the number of cases of periurethral abscesses, acute prostatitis epididymitis, and metastatic infections.

The chief indications for preliminary cystostomy are: inability to pass a catheter; serious local complications such as periurethral abscess; inability to tolerate the catheter when drainage is needed; a progressively severe infection in spite of catheter drainage; and the presence of complicating diseases requiring suprapubic operation. Chief among these are large bladder stones, bladder tumors not suited for cystoscopic treatment, and large diverticula which fail to empty.

In connection with cystostomy it should be pointed out that, if indicated, it must be done promptly and not after the patient is in desperate straits from the toxemia of a large periurethral abscess or other infectious process.

The Time for Operation

This is a question which is difficult to answer in general terms. The renal function should be the best obtainable in the particular patient. A phenolsulphonephthalein estimation should be done when the patient is first seen. If it is normal, no further preparation is needed so far as the kidney function is concerned. If it is materially reduced, drainage should be continued until the excretion reaches the highest possible level, particularly if open operation is contemplated. A moderate reduction in function is not a contraindication to transurethral resection if the condition of the patient is otherwise good, provided the operator is experienced so that the operation will be short. The inexperienced operator will do well to continue drainage until the kidney function reaches its acme, since the operation may be a serious undertaking, particularly with respect to loss of blood.

If the function remains stationary with drainage, no useful purpose will be served by prolonging it.

If infection is absent, the kidney function normal and less than three ounces of residual urine present, primary operation may be done. Mild chronic infection, good kidney function and a small residual urine require no preliminary therapy, while a more severe chronic type, particularly with functional impairment, requires drainage with forced fluids (three thousand cubic centimeters or more daily), urinary antiseptics, bladder lavage, using dilute silver nitrate, acriflavine, potassium permanganate, or the surgeon's favorite antiseptic (the mechanical cleansing is the important consideration) until the infection has subsided. The ketogenic diet may be of value. Pyuria which resists these measures must often be disregarded.

Acute renal infections as evidenced by fever and pain are absolute contraindications to operation. They require the same therapy as the chronic infections with functional impairment, with the addition that the patient should be kept in bed during the febrile period. Except for such times, care should be exercised to prevent the pa-

tient spending too much time on his back. The importance of moving about in bed, deep breathing, and pulmonary hyperventilation during periods of enforced bed rest cannot be overemphasized if lung complications are to be avoided.

What Are the Indications for Operative Treatment?

It is difficult to lay down any clean-cut criteria as to the necessity for operative treatment in bladder neck obstruction, since so much depends upon the situation of the patient. A poor man living on a farm far from medical help will, for his own safety, require an operation much sooner than his city brother who has physicians or charity clinics at his instant disposal. Too, one patient may elect to have an operation relatively early in the course of his disease to ward off future trouble, while another may try every conceivable means to avoid an operation until discomfort or danger makes it inevitable.

It is well known that a patient may recover from his first attack of urinary retention after the employment of simple conservative measures such as catheterization, hot sitz baths and rectal irrigations, and rest. Subsequent retentions are less likely to respond to such treatment, but may do so.

Moreover, patients with little or no residual urine but with definite obstructive symptoms may respond to similar measures, supplemented by prostatic massage, urethral instillations and dilatations, and bladder lavage.

The symptoms may often thus be relieved for years even after an attack of complete retention. On the other hand, the presence of considerable residual urine and of functional impairment are definite indications for operation, while persistent complete retention is an absolute one. Certain patients suffer such severe symptoms and are so refractory to conservative treatment that operation may be demanded before any retention develops.

The Type of Operation

This is a sore point in these days of transurethral resection (or endovesical revision or the punch operation if you prefer). In most instances it is a question of the operator's personal preference, there being very few absolute indications for any one type of procedure.

In early prostatic carcinoma without extension or metastasis Young's radical perineal prostatectomy is unquestionably the procedure of choice. In very large benign hypertrophies, suprapubic prostatectomy is to be preferred. I should define a "very large prostate" as one which makes transurethral resection technically very difficult or which will prolong it unduly. The actual criterion depends upon the operator's preference and ability. In this connection one must emphasize the fact that the size of the gland on rectal examination may diminish remarkably during drainage, so that one which feels as large as a tennis ball at the time of an acute retention may be smaller than normal after a week or two of drainage, due to the subsidence of edema. This same process may reveal, after a week or two, a typical hard, fixed carcinoma which was at first masked by edema.

Transurethral methods are required for small, firm glands, particularly those presenting a fibrous median bar, since these can rarely be enucleated, and suprapubic plastic procedures yield very poor results.

This bare outline leaves a large field for difference of opinion and discussion. It is the author's practice at present to resect all glands which are not so large as to present technical difficulties (one patient in the last one hundred eight operations on one hundred four patients). It is conceded at once, however, that this represents the writer's attempt to determine for himself and within his own limits how large a prostate he can resect advantageously. It may be that subsequent experience will lead him to modify his present attitude. In the meantime, the shortened hospitalization, the lower mortality (3.7 per cent in 166 operations on 158 patients, including thirty-eight carcinomas), not to mention the reduced expense for dressings, justify the policy. The question of recurrence in benign hypertrophy because of the necessarily incomplete removal of the abnormal tissue cannot be settled for some years to come.

I feel compelled to say, however, that the transurethral operation must be reserved for the experienced cystoscopist. For the man who occasionally "looks into the bladder" to attempt it is foolhardy, and is too often attributable to the activities of salesmen who picture the operation as one that any physician can do "if he buys our instruments." Even the experienced cystoscopist should begin, for technical reasons, with small glands.

Conclusions

It is almost trite to say that a low mortality in prostatic surgery depends upon a proper selection of patients and upon their thorough preparation. Once the patient is in proper condition, any capable surgeon can remove the prostate suprapubically or through the perineum. If the proper after-care, chiefly free drainage and an abundance of fluids, be given, the mortality will reach an irreducible minimum and will represent the unavoidable frailties of old age.

Functional results, on the other hand, depend upon surgical skill, particularly in perineal and transurethral operations, which surely require more experience than the suprapubic operation if good functional results and low mortality are to be had.

THE RISE AND DECLINE OF HOMEOPATHY

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THIRTY years ago it would have been impossible to have written an impartial account of the history and contributions of homeopathy to the practice of medicine without calling down upon the head of the writer a storm of violent criticism from both the defenders and opponents of that school of practice. Those of us who have embarked upon a medical career in the last two or three decades fail to realize the strength of homeopathy at the beginning of this century.

The rivalry between the homeopathic physicians and what were variously termed the "allopaths," "regulars," or "members of the old school" was intense. The laity adopted one school or the other and stood by their choice with, at times, almost a religious fervor. All this, from the viewpoint of modern medicine, seems extremely narrow-minded, yet even today the ultra-conservative medico might very occasionally lay himself open to a similar charge. The "regular" to a certain extent scoffed at and perhaps feared the homeopath, and the latter naturally resented this and strove more valiantly to prove the truths of his medical faith. The writer, incidentally not a homeopath, draws somewhat from personal experience, because he is the son of one of the past presidents of the Minnesota State Institute of Homeopathy.

To better understand homeopathy at its height, we must look to the years following 1900. The University of Minnesota Medical School, until about 1910, had for the last half of its course two faculties, entirely separate, the one of them homeopathic. When this was abolished, for two years more a chair of homeopathic philosophy and materia medica was maintained.

The Minnesota State Institute of Homeopathy, that is, the state medical society, was founded in 1867 (before the Ramsey County Medical Society) and held regular meetings until about seven years ago. Doctor Hutchinson, a homeopath of Saint Paul, was for several years after 1905 president of the State Board of Health. The superintendent of the Minneapolis City Hospital in 1905 was a homeopath, as were the staff and superintendent of the Fergus Falls State Sanitarium, and the superintendent of the Walker Sanitarium. The Ancker Hospital in Saint Paul had two complete and separate staffs until about 1915, one homeopathic and one "regular."

The State Medical Examining Board in 1895 consisted of nine men, three of whom according to law had to be homeopaths. In 1895, one patient out of every three admitted to the Minneapolis City Hospital was assigned to the homeopathic staff. In St. Paul the ratio was one to four. Other examples could be quoted, but this paper is not intended in any sense to be a eulogy of the past. The above examples are mentioned merely to show that in Minnesota, as elsewhere throughout the nation, homeopathy did grow to considerable strength and influence at one time.

Homeopathy, as a system of medicine, was given to the world by Samuel Hahnemann, who lived from 1755 to 1843. Before taking up the life of Hahnemann and the early history of homeopathy, it would be well to take note of the state of the science of medicine at that time,

approximately the year 1800. Primitive indeed was this early nineteenth century or, rather, late eighteenth century medicine. Bleeding, blistering, and purging were advised for nearly everything. Artificially induced abscesses or setons were in use. Complicated prescriptions of many ingredients of unknown action and in large doses were given on speculative hypotheses. A few measures were of proven value, but, for the most part, both diagnosis and treatment were utterly irrational.

The hospital situation was appalling. In the Hotel Dieu in Paris there were 1,200 beds, most of which contained four to six patients per bed. There were large halls containing up to 800 patients lying on pallets or heaps of straw in vile condition, and about 480 beds for single patients. Acute contagious cases were often in close relation to the mild cases, vermin and filth abounded, and ventilation was so abominable that the attendants and inspectors would not enter in the morning without a sponge dipped in vinegar held to their faces. Medical men themselves entered service in some of the hospitals with great fear and reluctance. Similar to this was the Allgemeiner Krankhaus in Vienna. Hospitals remained notorious for uncleanliness and general danger to life until well into the last century.

Bad as was the hospital situation, the facilities and methods for care of the insane were even worse. All but mild cases were either chained or put in small cages like animals. In Vienna these cages were put on exhibit and a small fee was charged for admission of the public, as to the sights of a menagerie. A bit more rational was the treatment in one locality for a melancholic or hysterical woman. She was treated to a volley of oaths and a deluge of cold water as she lay in bed.

The borderline between quacks and regular physicians was even more difficult to define than today. Dosage by legend, superstition, and empiric formula was the rule. Cure by touch, by John Hooper's Female Pills, Stoughton's great Cordial Elixir, Ching's Worm Lozenges, quassia cups, anodyne necklaces for pregnant women, Perkins' tractors, vied in favor with the beginnings of rational scientific medicine as taught by such men as Laennec, Jenner, John Hunter, Priestly, and others.

Into such a hodgepodge of science and superstition came Samuel Hahnemann, a distinguished German scholar, scientist, and physician, who was born in 1755 and died in 1843. Educated largely at Leipsic and Vienna, he defended his thesis on "A Consideration of the Etiology and Therapeutics of Spasmodic Affections" at the University of Erlangen, and was given his degree of Doctor of Medicine by this institution.

While in Vienna, he came under the notice of Dr. Von Quarin, physician to the Emperor Joseph and Maria Theresa, who was so impressed with the ability of his student that he made him his especial protégé, taking him even to visit his private patients, a thing he had never done before.

Von Quarin also secured for him the position of family physician and librarian to Baron von Bruckenthal, Governor of Liebenburgen, where he passed much of his time cataloging the Baron's immense library. By the time he gave up this position, he was a master of Greek, Latin, Hebrew, English, French, Spanish, Italian, Syriac, and Arabic as well as his native German, but his literary prowess was not at the expense of his scientific education and he was an accomplished chemist.

His "wine test" by which lead in a dilution of 1-30,000 could be detected in the presence of iron is used today and of it Trommsdorff's Journal of Pharmacy stated that ignorance of Hahnemann's wine test was damning evidence of the incompetence of many apothecaries.

In 1786 his masterly work on "Poisoning by Arsenic: Its Treatment and Judicial Investigations" marked a new era in the analysis and best modes of detection of arsenical poisoning. In it he opposed the unregulated sale of arsenic "fever powders" and proposed that there be a locked room for poisons in the drugstore; that only the proprietor or some responsible person should have the key; that record should be kept in a book of the name and address of the purchaser, who should sign this record, which should be open to the inspection of a Board of Examiners. In his research, he quoted 861 passages from 389 different authors and books in different languages and belonging to different ages, giving accurately both column and page.

For seven years (1787-1794) he was a contributor to Crell's Annals of Chemistry.

Demachy was one of the first chemists of the day and the French Academy had published his work on the "Art and Manufacturing of Chemi-

cal Products" in order that the people of France might learn the various processes of the manufacturer hitherto kept for the most part as trade secrets, especially by the Dutch.

Hahnemann translated this work into German, adding copious original notes to the text, quoting exhaustively from many authors. Where Demachy remarked that he knew of no work on the carbonification of turf, Hahnemann mentioned six; he quoted a French analyst without giving his name and Hahnemann furnished both the author's name and the title of his book; he mentioned a celebrated German physician and Hahnemann gave the name, book and passages, etc., etc. He corrected the mistakes of the author regarding the use of alum in Russia, Sweden, Germany, Italy, Sicily, and Smyrna; he gave new directions for making of retorts and introduced many original chemical improvements and tests, and altogether made the work the most complete treatise of its time on the subject.

His ideas in medicine were equally advanced. He reported his treatment of caries of bone by clean curettage and alcohol dressings. Early in 1792 he advocated, in a journal, a humane treatment for the insane, who were at that time treated more as criminals, with the result that he was in June of that year placed in charge of one Klockenburg, Minister of the Police of Hanover, who recovered under his care. It was at the end of that year that Pinel made his first experiment of unchaining the maniacs at Bicêtre, Paris.

This brief review has been given in evidence of the fact that Hahnemann was neither an ignoramus nor a charlatan.

To one of scientific habits of thought, the application of the medical knowledge of 1800 in the care of the sick was most depressing, and fearing lest he should actually do more harm than good Hahnemann gave up his practice and devoted himself to the more gratifying subjects of chemistry and the languages.

Thus it happened that, in 1790, he translated William Cullen's "Treatise on the Materia Medica." Not satisfied with the author's explanation of the efficacy of cinchona bark in intermittent fever, he took some of it himself in experiment. Presumably he had an idiosyncrasy for the drug; at any rate he developed the majority of the symptoms of its physiological action and much to his surprise this reaction was similar to the condition for which it was being successfully used.

Had he stumbled upon a scientific basis for prescribing such as he had longed for? The paradox of similars did not disturb him probably as much as it would physicians of today because the treatment of "likes by likes" had been advocated in an unscientific way since the days of Paracelsus. He tried it again on himself, then on his family and such friends as would submit to his experiment and with the same result.

Then came a search through the annals of medicine for reports of medical cures and the effects of drugs on the healthy, as in cases of poisoning, and he eventually reported nearly 500 citations covering sixty-three drugs in which there was a relationship of similarity between the action of the drug on the healthy body and the manifestations of the disease.

In 1796 he presented his observations in an "Essay on a New Principle for Ascertaining the Curative Powers of Drugs" which was published in professional manner in Hufeland's Medical Journal at Jena, and, in 1806, in a pamphlet entitled "Medicine of Experience."

Meanwhile he had been studying drug effects on the healthy by experiments on himself and fellow workers. Eventually these were published in his work "Materia Medica Pura" in which are given what he called the "proving" of fifty-four remedies.

In 1810 he published his "Organon of Medicine," which title seems to have been inspired by Bacon's "Novo Organum" and in which he applies Bacon's inductive reasoning to medicine.

It is worth while to quote verbatim the first four articles:

1. "The physician's high and only mission is to restore the sick to health, to cure, as it is termed."

2. "The highest ideal of cure is rapid, gentle, and permanent restoration of the health, or removal and annihilation of the disease in its whole extent, in the shortest, most reliable, and most harmless way, on easily comprehensible principles."

3. "If the physician clearly perceives what is to be cured in diseases, that is to say, in every individual case of disease *(knowledge of disease, indication);* if he clearly perceives what is curative in medicines, that is to say, in each individual medicine *(knowledge of medicinal powers);* and if he knows how to adapt, according to clearly defined principles, what is curative in medicines to what he has discovered to be un-

doubtedly morbid in the patient, so that the recovery must ensue—to adapt it, as well in respect to the suitability of the medicine most appropriate according to its mode of action to the case before him *(choice of the remedy, the medicine indicated)*, as also in respect to the exact mode of preparation and quantity of it required (proper *dose)*, and the proper period for repeating the dose;—if, finally, he knows the obstacles to recovery in each case and is aware how to remove them, so that the restoration may be permanent: *then he understands how to treat judiciously and rationally, and he is a true practitioner of the healing art."*

4. "He is likewise a preserver of health if he knows the things that derange health and cause disease, and how to remove them from persons in health."

Regarding the exciting cause he writes farther on:

"It is not necessary to say that every intelligent physician would first remove this where it exists; the indisposition thereupon generally ceases spontaneously. He will remove from the room strong-smelling flowers, which have a tendency to cause syncope and hysterical sufferings; extract from the cornea the foreign body that excites inflammation of the eye; loosen the overtight bandage on a wounded limb that threatens to cause mortification, and apply a more suitable one; lay bare and put a ligature on the wounded artery that produces fainting; endeavor to promote the expulsion by vomiting of belladonna berries, etc., that may have been swallowed; extract foreign substances that may have got into the orifices of the body (the nose, gullet, ears, urethra, rectum, vagina); crush the vesical calculus; open the imperforate anus of the new-born infant, etc."

The rest of the work is occupied with amplifying these principles.

In his consideration of what is to be cured in disease, he directs that each case must be individualized and that treatment should be directed against what he calls the "totality of the symptoms," by which he means everything that can be learned about the patient. To this end he gives detailed instructions for a written case record (an innovation to medicine) beginning with the patient's voluntary statements; amplified by the examiner's questions, which should never be leading; and concluded by what the physician can observe. This section of the work could be embodied verbatim in a modern textbook on diagnosis and not be out of place. We know that Hahnemann used the recently invented stethoscope and there is no reason to believe that he would not have used all the other instruments of diagnosis had they been at his command. His references to surgery indicate that he considered this a separate department of practice not in conflict with his system of medical treatment except in borderline cases.

In his consideration of what is curative in medicines, he proposes the innovation of ascertaining their action by their administration to healthy human beings, the emphasis being upon the word "healthy"" rather than "human," for experimentation upon the lower animals does not seem to have occurred to him. He gives credit for the idea to Von Haller, who was the only person so far as he could discover who had previously advocated it and no one had followed up his suggestion.

The application of the drug to the disease, he said, should be on the basis of similarity of action to manifestation, in accordance with what he called a therapeutic maxim, "Similia, similibus curentur": let likes be treated by likes. This maxim has sometimes been erroneously quoted as "Similia similibus curantur," likes are cured by likes, but the first spelling is correct and more properly describes Hahnemann's original idea as a *principle* of *treatment* rather than a *guarantee* of *cure*. Naturally giving a drug for symptoms similar to those which it will produce requires the dose to be subphysiological.

This theory that "like cures like" has always been a target for ridicule by other members of the medical profession. Of course, Hahnemann's reasoning on this point was purely inductive and general laws were promulgated from a smaller group of specific cases. However, many conclusions arrived at by purely inductive reasoning stand today as established facts in medicine. Let us try to state the ancient homeopathic principle of "let likes be treated by likes" in more modern language and see whether it may not at least cease to appear medieval and without foundation.

If a patient is suffering from a certain disease, for example, a low grade pulmonary tuberculosis, hay fever, poison ivy dermatitis, common cold or furunculosis, the patient's resistance, opsonic index, immunity, or what have you, can be increased by giving to that patient something which tends to aggravate the symptoms, produce similar symptoms, stimulate the forces in the body combating that disease; in short to immunize the patient. Let that medication be tuberculin, poison ivy vaccine, chlorine or a vaccine for colds, a

vaccine for furunculosis, foreign protein therapy if you will, or let it be a drug proved by long and careful experiment on healthy human beings to produce similar effects. The outcome of the disease, it would often seem, is not much affected by either the treatment of 1934 or the treatment of 1800, but the theory of treatment in these widely separated eras is possibly not so widely separated as we would sometimes fondly believe. We self-termed modernists (medievalists we will be called in the year 2034) delight to scoff at primitive medicine and congratulate ourselves on our pure scientific attitude as doctors. And yet perchance there was a bit of wisdom in the ancients, and even possibly a bit of folly in modern medicine.

But to leave philosophy and return to our history: Hahnemann, in addition to all the above, advocates most strongly the single remedy rather than "shotgun" prescriptions for disease. And finally he urges the value of hygiene and general supportive measures as adjuvant to the administration of drugs.

These then are the principles of homeopathy, many of them original contributions to modern medicine.

1. The individualism of cases.
2. The minute attention to subjective and objective manifestations of disease with written record.
3. The determination of drug action by experiments on living and healthy tissue.
4. The prescribing of drugs for curative purposes on the basis of similarity.
5. The condemnation of polypharmacy.
6. The minimum dose.
7. The removal of the cause when it can be found and removed.
8. The value of hygiene.
9. The resort to surgery in non-medical cases.
10. The prevention of disease.

This was the conception of homeopathy held by the founders of the American Institute of Homeopathy in 1844 when they limited their membership to physicians who were Doctors of Medicine (although this degree was not universally held nor considered necessary to practice), and when there was not a homeopathic college in the world.

This was also the conception of homeopathy held by the later members of that same body when they defined a homeopathic physician as "one who *adds* to his knowledge of medicine a special knowledge of homeopathic therapeutics and who observes the law of similia. All that pertains to the great field of medical learning is his by tradition, by inheritance, by right.

Hahnemann was not a saint and he was not infallible. When his theories, presented in professional manner, were not generally accepted, but rather subjected to the criticism given all new pronouncements, even when true, he developed an invective that was not conducive to a fair consideration of his thesis, and later in his life he developed a dogmatism which was most unfortunate.

Not satisfied with the statement of his observations regarding drug actions, he proceeded to explain them with theories as speculative as any which he had condemned in his opponents.

Of course, Hahnemann made mistakes which, in the light of our present day knowledge, seem uncalled for, but so did most of the great pioneers in medicine. Certainly his contributions can be weighed against his errors with credit to him.

Unfortunately many great movements seem destined to suffer at the hands of their unintelligently overenthusiastic followers. Just as the fundamentalists of the French Canadian Colonies were said to be more French than the king and more Catholic than the pope, so many of the earlier homeopaths were more Hahnemannian than Hahnemann.

They carried their minute examinations of symptoms to a detail that had nothing to do with disease. A blond patient living in a brown stone house on the south side of the street may have been thought to require a different medicine from a brunette living in a green frame house on the north side. They carried the dilution of drugs (which was, of course, done on the principle that a small dose of a drug cures symptoms produced by a large dose) to an extreme that was idiotic. Homeopathic dilutions are made from the tincture of the drug, a one X dilution being one to ten, a two X, one to one hundred, et cetera. Dilutions of twelve X, one to a trillion, were not infrequently used. One extremist advocated the making of dilutions by placing a drop of the tincture in a beaker and running water from a faucet into it, the length of time for this procedure depending upon the dilution desired. It has been estimated that in order to make the dilutions in full quantity of one drop of the

original tincture to some of the highest dilutions used would require more water than the total in all the oceans of our planet.

In their zeal for the individualization of cases, they denied the value of a diagnosis and treated symptoms only, according to homeopathic principles, and, worst of all, Hahnemann's followers so far forgot his teachings that they overlooked the fact that homeopathy was not presented as a "cure-all" and that it did not exclude the use of other therapy of value such as surgery, hygiene, new drugs with direct action as morphine, and digitalis, vaccines, antitoxin, et cetera.

The modern rational homeopath was quick to make use of all advances in scientific medicine as they were presented. He was willing to discard his empiric drugs in place of newer therapy of greater value, and was able to realize that a system of therapeutics a century old would eventually be largely replaced by new discoveries. A prominent physician speaking before the state homeopathic convention in about 1910 showed that attitude of the progressive element when he said, "Homeopathy has made a great contribution to the progress of medicine. It has been a pleasure and an honor to practice during its greatest years. Its mission has been fulfilled and from now on we can expect to see its strength gradually diminish with the advance of modern medical science."

Hahnemann and homeopathy held a very important place in the practice of medicine during the past century. By this group was initiated the scientific study of the physiological action of drugs, by them over-dosage in "shotgun" prescriptions was first discouraged, and in stressing the importance of hygiene and general care in combination with these principles they helped to build the foundations for what we fondly term modern medicine. That many of the old homeopathic drugs are now either replaced or have been proved without benefit may be true, but it is also equally true that some of these drugs, condemned by intolerance rather than by test, may be of great value and are perhaps entitled to a more careful proving before being relegated to a position of mere historical interest.

Today there are two homeopathic medical schools of importance, one in New York, and one in Philadelphia. The proportion of physicians trained in homeopathic schools is rapidly decreasing, and the bitter partisan feeling of thirty years ago is met with only occasionally. Homeopathy as a distinct entity is vanishing—but the fact that the homeopathic school has persisted for over a century in spite of its irrational enthusiasts and equally irrational critics, and has produced some of the great physicians of the country, is a just tribute to its real contribution to the practice of modern medicine.

CASE REPORTS

THE USE OF MAGGOTS IN OSTEOMYELITIS AND NECROSIS*

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The use of maggots in osteomyelitis of the humerus is the first case which I am reporting. It is, I believe, the first case so treated in a Saint Paul hospital. This case can be best presented by a brief review of the history and my operative procedure before introducing the maggots.

At 9:30 p. m., October 23, 1931, I was called to see a man whom I found in bed suffering from terrible paroxysms of pain in his left arm. On September 11, 1931, while working with a paving crew handling a tamping machine, he was hit on the left arm between the shoulder and elbow by some part of this machine. The arm pained him for a few days but not enough to prevent his working. After the pain wore off he experienced numbness in this area. He applied liniment to the arm and continued to work.

On October 18, 1931, he had a sudden severe pain in the arm between the shoulder and elbow which made him sick and weak. Upon looking at his arm he saw a small red area about the size of a half dollar on the outer side of the arm about half way between the shoulder and elbow. He called on a physician, who advised him to go to bed and apply hot applications. This he continued doing with the condition growing worse until I was called on the evening of October 23rd.

Upon examination I found an unusually muscular man, about thirty years old. He was perspiring freely and undergoing paroxysms of pain about every two minutes. The left humerus was found to be exquisitely tender, most marked at the junction of the lower

*Read before the Wabasha County Medical Society, July 6, 1933, Wabasha, Minnesota.

and upper third. The skin was quite red, which may have resulted from the hot applications that had been applied. His temperature was 104 degrees F., respiration 52, and pulse 130.

I advised immediate removal to the hospital for operation and took him to St. John's Hospital, Saint Paul, where he was admitted at 12:20 A. M. Anterior-posterior and lateral x-ray films were made of the left elbow, including the upper third of the radius and ulna, and the lower two-thirds of the humerus. No evidence of bone or joint disease could be found. His white cell count was 16,000; urine negative.

Under ethylene anesthetic, an incision was made about four inches long over the external lateral lower third of the left humerus, the muscles being separated carefully down to the periosteum, to prevent injury to any nerves. The periosteum appeared darker in color than normal and, incising it, a small amount of pus exuded. I then drilled into the cortex of the humerus at the junction of the middle and lower third. As soon as the drill reached the medullary cavity grayish pink pus welled out from the drill hole, indicating that it was under considerable pressure in the medullary cavity. Three more holes were drilled parallel to the shaft of the humerus distal to the first hole, the lower two close enough together to unite them. Into the lower two a rubber drain was inserted well into the medullary cavity. Iodoform gauze was packed loosely into the opened muscle area. A few skin clips were used to hold the drain in place. Smears and cultures were taken of the pus before drains were insterted and the laboratory reported many staphylococcus colonies. After the operation the patient was returned to his room with Dakin's dressing over the wound.

The following afternoon his temperature was again 104 F., pulse 120, respiration 30. His temperature ran from 101 F. to 104 F. until on the fifth post-operative day it went to 106 F., pulse 160 and respiration 28, after which his temperature dropped from 103 F. to 101 F.

On November 19, 1931, owing to the fact that the patient was very toxic and the muscles were growing over the drill holes in the bone and interfering with drainage, we again enlarged the skin incision, separated the muscles and made larger holes in the medullary cavity. Following this procedure the drainage improved and his condition improved but x-rays on December 12, 1931, were reported as follows: "There is evidence of further attempt at involucrum formation but that repair is overbalanced by destruction of middle and lower thirds, particularly of the lower end of the humerus where the external condyle is undergoing sequestration. There is marked narrowing of articular space between the external condyle and the head of the radius, indicating destruction of joint cartilage."

Two days after this report his temperature again shot up to 103.2 F., pulse 125 to 130, and he again became very toxic and marked swelling developed about the elbow joint. On December 18, 1931, he was again anesthetized in his room under nitrous oxide and the incision was lengthened to 10 inches. The muscles were separated with blunt dissection down to the bone, the periosteum stripped off and the medullary canal opened up and down for about ten inches along the lower and middle thirds of the shaft of the humerus. A penrose drain was inserted into the elbow joint region and the opening in the medullary canal was filled with vaseline gauze strips. Following this procedure his temperature came down some but his general condition was poor, and the soft parts of his arm from shoulder to elbow seemed to be in such a highly infectious and necrotic condition that amputation seemed highly probable as the next necessary procedure. The report of the laboratory of specimens removed at the operation was as follows: "The specimen of bone consisted of three fragments, one which measured 4 x 2.5 x 1 cm. which appeared to be the cortex of a long bone. It was thickened and showed sequestrum formation on its inner surface. It appeared to be definitely necrotic on the under surface of the specimen. The other two fragments measured 3.5 x 2 x 5 cm., respectively, and had the gross appearance of sequestra."

He was typed for blood transfusion but this was delayed because of his severe reaction on intravenous glucose injection.

Beginning December 20, 1931, normal saline only was use for moist dressings on the arm and on December 22, 1931, he was given 1500 units of tetanus antitoxin and on December 23, 1931, hypodermoclysis of 5 per cent glucose was again given. Maggots* were introduced into the wound the morning of December 24, 1931.

There were twelve consecutive applications of maggots to the wound. Each set of maggots was left on five days and removed. Twenty-four hours were always allowed to elapse before new maggots were applied and in a few instances the patient was allowed to rest for as much as three days before they were reapplied. About the third day after the application of maggots, a piece of sequestrum 9 cm. by 2 cm., half cylindrical in shape with its surface markedly roughened, was removed with little difficulty. He was under maggot treatment for seventy days. While the wound was full of necrotic tissue, the maggots grew rapidly in size. The last two batches of maggots did not live, as the wound was clean and devoid of necrotic tissue. At first the wound discharged much thin pus following the application of the maggots until it was necessary to cut a trap in the copper gauze over the wound and withdraw the pus with a glass syringe several times a day; but as the necrotic material disappeared this subsided and at the time of the last two applications of maggots the wound was filled with straw-colored, clear serum, on the surface of which floated a few fat droplets. The exposed muscle was clean and the skin edges and superficial fascia had a good granulation surface.

During the application of maggots to the wound, it was remarkable how the toxic condition of the patient decreased and his appetite improved. His hemoglobin, which was 50 per cent at the time of the first application, came up to 65 per cent at the end of the treatment. His white cell count dropped from 16,200 at the beginning of the treatment to 9,800. Two days before and during the intervals between maggot treatments, the wound was dressed with normal saline dressings. Because of the psychic reaction he might have had to the procedure, great care was taken, and with complete success, to keep the patient unaware of this maggot treatment. He left the hospital September 22, 1932.

The patient now has an arm ankylosed in a good useful right-angle position and has the use of his hand. He has occasionally a small drainage of pus from the elbow but this is decreasing, and he is working every day operating a truck. His weight in the hospital on the first day that he was able to go to the scales was 153 pounds; now he weighs 195 pounds.

My opinion is that the benefit the patient derived from the maggot treatment was not due to any enzymes stimulating his organism, but to the devouring of the necrotic mass of tissue by the maggots and thus ending its absorption by the patient.

The second case that I am reporting illustrates a new and different use for maggots. In this instance they were used for the purpose of removing a large mass of necrotic tissue on the lateral aspect of the middle of the left arm, undoubtedly due to necrosis following repeated hypodermic injections in this region.

The clinical history follows:

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*These were obtained from the Lederle Laboratories.

A man, aged sixty-four, was brought to St. John's Hospital on November 21, 1932, suffering from a boggy, edematous, indurated swelling of the perineum and area surrounding the anus. This mass was very tender and painful on palpation, and a rectal examination disclosed on the left side and involving the prostatic gland an induration which was very tender. There was no fluctuation but a prostatic abscess appeared to be forming, not yet ready to incise. His temperature was 102 F., pulse 100, and respirations 21. His physical examination was otherwise negative.

The laboratory examinations revealed the patient to be a diabetic. The urine contained 4 per cent sugar; the blood sugar was 235 mg. per 100 c.c. of blood. The x-ray films showed the outlines of both kidneys indistinctly. There was no evidence of renal, urethral, vesical or prostatic calculi.

The patient was placed on insulin and a diabetic diet but he grew worse and had several chills. Rectal examination still did not show any area of fluctuation developing in the region of the prostate. Hot packs were continuously applied. On December 1, 1932, he became unable to void. A proctoscopic examination revealed swollen external hemorrhoids and an inflamed mass in the rectum over the prostatic area. There was no evidence of fistula or ulcers in the rectum or lower colon. He was then catheterized every eight hours unless able to void voluntarily, and on December 1 an indwelling catheter was inserted.

His general condition continued growing worse. He developed involuntary bowel movements and was at times delirious. His temperature rose to 105 F., white blood count 17,000, and he was very toxic. Repeated intravenous injections of normal saline were given, and on December 3 he was given a blood transfusion of 640 c.c. of whole blood by the Scannell method.

Following this his general condition improved and an area of fluctuation developed in the prostate. On December 5, 1932, an abscess of the prostate was opened through the perineum and a retention urethral catheter was inserted into the bladder. His condition then improved and his temperature fell to normal on the fifth post-operative day.

On the night of the ninth post-operative day he complained of pain in his left arm and on the following day he developed a cough and commenced to raise considerable phlegm. His pulse and temperature increased and it was evident that he had developed influenza. His heart required considerable stimulation, which was administered frequently by hypodermic medication together with regular injections of insulin. A red swollen area appeared on his left upper arm on December 16, which had increased to the size of a baseball by the evening of December 17 and was hard and indurated. His influenza infection did not improve and he became so toxic from the necrotic mass forming in his left arm together with his respiratory infection that I deemed it necessary to give him a second blood transfusion on December 20. His general condition showed improvement after this and his resistance to the influenza increased so that seven days after the blood transfusion his temperature was again normal.

However, the red indurated mass on his left arm did not develop into an abscess under hot pack treatment, but turned into a large white mass of necrotic tissue, 11 cm. long and 5 cm. wide, oval in shape. No pus exuded from any openings on its surface and there was no definite line of demarcation nor bright red line of separation about the edge of this necrotic mass. There was no evidence of healing. Therefore, I applied maggots to the area January 2, 1933, at the same time giving 1500 units of tetanus serum. These maggots were removed January 4 because they had all died, probably due to the fact that the necrotic tissue had absorbed both Dakin's and boric acid solutions used in the hot packs applied to the area. From the center of this mass a piece about 1 cm. deep and about 5 cm. by 3 cm. was removed and warm saline solution packs only were used on this area until the morning of January 7, 1933, when I again applied maggots. By January 8th the arm commenced to drain a moderate amount of serous fluid through the lower portion of the maggot trap. The drainage increased moderately from day to day until the maggots were removed on January 11th, by irrigating with saline solution into a pus basin containing a strong solution of lysol. This was advisable to do because the maggots were large and very active.

The appearance of the wound after the maggot treatment was very striking. The floor of the wound consisted of muscle entirely denuded of fat and fascial sheath and showing the muscle fibres themselves. The edges of the wound were clean cut and had a punched-out appearance with only healthy skin remaining, but the edges were thinned out and undermined so that a probe could be passed under for 7 cm. below the edge of the skin on the inferior border of the wound toward the elbow, and for about 4 cm. superiorly toward the shoulder. The undermining along the lateral borders of the wound was only from 1 to 3 cm. in depth. But all of the wound was thoroughly free from necrotic substance, only live, healthy tissue remaining with no hemorrhage or oozing of blood. One application of maggots had completely removed all of this mass of necrosis in five days.

Dakin packs were then used on the area and in seven days the undermined edges had adhered to the granulation tissue forming in the base of the wound. On the floor of the cavity appeared pinkish red translucent granulations, and the edges became sloping and bordered by a thin, bluish white layer of young growing epithelium. But the healing of skin from the edges was so slow that on January 30th I performed a Thiersch skin graft, taking the skin from a male relative. Most of this graft took and in fifteen days after the graft the growth of skin had completely covered the area.

This patient spent a long convalescence period in the hospital after this, due to the slow healing of his perineal wound subsequent to opening the prostatic abscess. Because of his weakened condition complicated with diabetes, there was much sloughing about the perineal wound, and a retention catheter had to be kept in place to allow a urinary fistula to close. Maggots in the perineal wound were, of course, inadvisable due to the impossibility of placing a maggot trap in this location.

In conclusion, it would seem that we have in maggot treatment of necrotic tissue a means of removing dead tissue much more completely and efficiently than with the knife. No normal living tissue is sacrificed because the maggots do not devour living tissue. This was shown in the first case reported, when the maggots upon the last two applications died because of insufficient tissue to feed upon.

It is my opinion that this treatment may be added to the armamentarium of surgery wherever a necrotic area exists which does not rapidly develop a line of demarkation between living and dead tissue and complete separation does not readily occur; also, where undermining of living tissue by necrosis develops, as sometimes happens in diabetes, nephritis or senility, and wounds or ulcers assume an unhealthy looking, soft, edematous granulation, popularly known as "proud flesh."

TRAUMATIC PSEUDO-CYST OF THE PANCREAS

WILLIAM R. BAGLEY, M.D.

Duluth, Minnesota

H. M., a barn man, aged twenty-one, was first admitted to St. Luke's Hospital on March 29, 1932, having been kicked in the mid-abdomen by a horse, several hours previously. He was complaining of severe upper abdominal pain and had been vomiting. There was no blood in the vomitus.

Examination revealed a well developed white male in acute pain. Imprint of a horse's hoof was visible on the skin of the upper abdominal wall and he complained of extreme tenderness in the epigastrium and in the right upper quadrant of the abdomen. The abdominal wall was very rigid. Temperature was 98.2, pulse 80, B. P. 110/60 and white blood cell count 15,400. He was put to bed and morphine sulphate gr. ¼ was ordered to be given as often as necessary to control the pain. Nothing was given by mouth except cracked ice.

The pain was controlled, vomiting ceased, and pulse and blood pressure remained normal. The temperature rose to 99.6 on several occasions, but did not remain elevated for a prolonged period. Neither the stools nor vomitus at any time showed blood. The urine, which on admission contained scattered red and white cells, became normal. Slight rigidity and tenderness persisted over the gallbladder region but since the patient felt otherwise well he was discharged from the hospital after a nine day stay.

At home, the pain and tenderness in the right quadrant persisted for three months (April, May and June). It then gradually subsided. In July, however, when the patient tried to work again, he experienced pain, particularly on moving about.

On October 2, 1932, he was again admitted to St. Luke's Hospital. For the past two weeks he had been belching a great deal and for the past three days he had vomited frequently. He had lost fifteen pounds in weight. Examination at this time was negative except for right sided abdominal tenderness, and a leukocytosis of 17,200.

The first operation was performed on October 4, 1932 (Dr. Bakkila). A pseudo-cyst of the pancreas was found and drained. Areas of fat necrosis were present, and the tail of the pancreas was firm and enlarged. Convalescence from this operation was stormy and fluid in the cyst rapidly reaccumulated, causing gastric obstructive symptoms due to pressure.

Five subsequent operations were performed at varying intervals combining the procedures of marsupialization, suturing the cyst cavity to the abdominal wall, uniting the greater and lesser omental bursæ and attempting to obliterate the cyst cavity with chemicals, and finally extirpation of the cyst wall. The accumulation of fluid was apparently encysted in the lesser omental bursa, and when it attained considerable size, caused pressure on the stomach and duodenum, with pain and vomiting. Each time there was difficulty in maintaining drainage. The last operation was performed October 6, 1933, just one year after the original injury. This time it was possible to enucleate the wall of the cyst-cavity, which lay back of the stomach and burrowed under the pancreas. The tail of the pancreas was found to be connected to the body by only a narrow band of pancreatic tissue containing blood vessels. The tail of the pancreas distal to the point of injury was removed along with the cyst. The gallbladder, which had been drained at one of the previous operations, was removed. Hydrops of the gallbladder had resulted from occlusion of the cystic duct at the time of injury.

Recovery from this last operation was uneventful and the patient was dismissed from the hospital on the eleventh postoperative day.

He has been seen from time to time and at the present time, seven months later, he is well and back at work.

Report from the pathologist: The cyst wall is very thin and transparent in some areas; in others, 0.2 cm. thick. It is made up of cellular connective tissue with a few scattered atrophic glandular acini and an occasional duct. The internal surface is partially lined by a layer of flattened cells.

The portion of pancreas removed consists of markedly fibrotic tissue with scattered islands of pancreatic tissue and occasional masses of cells resembling Islands of Langerhans. Marked lymphocytic infiltration is present.

Discussion

This case brings up several very interesting points. The amount of fluid secreted by these injured tissues was remarkable. Even though frequent attempts were made to obliterate the cavity with iodine, iodoform gauze, etc., fluid reaccumulated in large amounts. It was difficult to maintain external drainage. As soon as drainage stopped, the patient suffered with symptoms due to obstruction of the pylorus from pressure.

The probable course of events was as follows: The impacting horse-hoof crushed the pancreas against the spine, cutting through approximately two-thirds of its width at that point. The central pancreatic duct probably remained intact, but since the support of surrounding pancreatic tissue was removed, this duct gradually dilated. At a certain stage of tension, the sac ruptured and its contents escaped into the lesser omental bursa. Thus, the large cystic mass was formed, which at one time contained as much as 3,000 c.c. of fluid. This huge mass lay behind the stomach, pressing it against the anterior abdominal wall and causing obstruction to the passage of food. Drainage was difficult to maintain and attempts to obliterate the cavity with chemicals were unsuccessful. The partial epithelial lining was no doubt responsible for the continued secretion. Continuous drainage had been established several weeks before the final operation was performed. At this operation the sac contained only about two ounces of fluid and it was possible to enucleate it entirely.

Hydrops of the gallbladder had occurred during the course of events, due to gradual stenosis of the cystic bile duct, which was no doubt traumatized at the time of the original injury. Drainage of the gallbladder gave clear mucus, without bile. The gallbladder was removed at the final operation.

The removal of the tail of the pancreas, distal to the point of injury, had no untoward effect upon the patient's recovery. Diabetes is an infrequent accompaniment of these cysts, even with extensive pancreatic injury. In our case, sugar appeared in the urine only during the time when glucose was being administered intravenously postoperatively.

It is interesting that the only enzyme present in the cyst fluid was a lipase. No amylolytic or proteolytic enzymes were found. In reports appearing in the literature, all three enzymes or any one or two of them may

be present. The presence of enzymes is not pathognomonic of pancreatic cysts, since enzymes, particularly sugar-splitting enzymes, may be found in peritoneal and other exudates.

Traumatic cysts, or pseudo-cysts, of the pancreas are reported not infrequently in the literature. They are probably the most frequent type of pancreatic cyst. Moynihan was one of the first to call attention to the fact that many so-called pancreatic cysts are in reality effusions of fluid into the lesser omental bursa, and should therefore be designated pseudo-cysts or peripancreatic cysts. These cysts may or may not contain an epithelial lining. It is argued that if they are formed from dilatation of a duct or gland acinus, they should have an epithelial lining. However, it is found that the lining may disappear, possibly from pressure. Therefore, the presence or absence of epithelium within the cyst does not give us any information as to the origin of the cyst.

905 Medical Arts Building.

CITROCARBONATE, ACETONYL, SALICIONYL, BROMIONYL, BROMIONYL WITH ACETYLSALICYLIC ACID, BROMIONYL AND BARBITAL, OINTMENT SCABICIDE, KEROLYSIN, SUPER D COD LIVER OIL; PRODUCTS OF THE UPJOHN COMPANY, NOT ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that for many years the Upjohn Company of Kalamazoo, Mich., has exploited to the medical profession, and indirectly to the public, a large number of pharmaceutic preparations. This firm has developed promotion through the agency of "detail men" to a high state of efficiency. Some preparations of the Upjohn Company have in a few instances largely replaced standard nonproprietary products of equal or greater merit, to the financial benefit of the firm and to an equivalent financial detriment to the public. The Council has considered some of the more widely used Upjohn preparations. The Council declared Citrocarbonate, which is stated to be "An alkaline effervescent mixture of organic salts of Lime, Potassium, Sodium, and Magnesium properly balanced," unacceptable for inclusion in New and Non-official Remedies because it is a mixture of semisecret and unscientific composition, containing an excessive number of active ingredients, marketed with extravagant and unwarranted therapeutic claims, under a misleading and uninformative name. Acetonyl, said to constitute "Granular Effervescent Alkaline Acetylsalicylates," and Salicionyl, claimed to be "A granular effervescent salt presenting sodium salicylate in such a way as to reduce the incidence of those unpleasant features which complicate the use of salicylates alone," were declared unacceptable for the same reasons that determined the Council's action in the case of Citrocarbonate. Bromionyl, another granular effervescent salt, is not acceptable for New and Non-official Remedies because it is apparently an unnecessarily complex mixture of semisecret composition sold under a misleading name, and Bromionyl with Acetylsalicylic Acid and Bromionyl with Barbital are even less acceptable than the parent substance because the differences in the rates of elimination of these substances from the body makes dosage in fixed ratio irrational. Ointment Scabicide, said to contain "the polysulphides of potassium," was declared unacceptable because it is a semisecret preparation, apparently of unscientific composition, marked with a therapeutically suggestive name which has frequently led to self medication by the public. Kerolysin, which is said to contain "Acid Benzoic 12 per cent, Acid Salicylic 6 per cent, Thymol 1¼ per cent in a suitably adapted ointment base," was declared unacceptable for New and Non-official Remedies because it is an unessential modification of a well known mixture, marketed with unwarranted therapeutic claims under a proprietary, therapeutically suggestive name, uninformative of its essential constitutents. Super D Cod Liver Oil, said to be assayed by the U.S.P. method for vitamin A potency and to contain not less than 25,000 units per ounce, and to represent "a vitamin D potency of not less than 10,000 units per ounce, controlled by the McCollum line test . . . ," was declared unacceptable for New and Nonofficial Remedies because of its semisecret composition and indefinitely designated vitamin potency and because of its objectionable name. (Jour. A. M. A., May 20, 1933, p. 1597.)

VITAMIN D AND WELL BEING

New problems in relation to the possible function of Vitamin D in promoting bodily welfare continue to arise, despite the commendable progress of recent years. One concerns the uncertainty of the need of supplementing the diet with added Vitamin D if it is liberally supplied with the appropriate mineral constituents, notably calcium and phosphorus. In new studies on animals that were subjected over long periods to extreme calcium deprivation, Templin and Steenbock of the University of Wisconsin found that the introduction of moderate amounts of Vitamin D into the calcium-deficient ration provided considerable protection from mineral losses in a parallel series of rats. The results tend to support the impression of the value of Vitamin D as a food constituent for the adult. The Wisconsin biochemists frankly insist that it is unwarranted to expect that Vitamin D administered in any amount should be able to compensate fully for an extreme lack of calcium or other dietary essentials. As the basal diet was not optimal with respect to protein or phosphorus content, it is possible that the favorable effects of Vitamin D on calcium conservation might have been accentuated if the diet had been improved in these respects also. This is equivalent to the much needed reminder that vitamins are by no means the sole essentials for a healthful diet. (Jour. A. M. A., May 27, 1933, p. 1692.)

D.C.P. 340 NOT ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that according to a circular and form letter forwarded by a physician to the Council, D.C.P. 340 is the name under which Parke, Davis & Company markets a preparation of dicalcium phosphate. Firms which have had dealings with the Council as long as Parke, Davis & Company are well aware of the Council's sound objections to the use of letters and numerals for, or in connection with, the names of medicinal products. The product is apparently intended to exploit the current interest in calcium-phosphorus therapy or prophylaxis. The circular cites the work and opinion of Sherman in support of the thesis that ". . . the average American . . . dietary is actually low in both of the factors [calcium and phosphorus]." The Council has held that this thesis is by no means established. New and Non-official Remedies, 1933, p. 129, states: "The average normal diet usually contains just about enough calcium for the needs of the body. . ." While there may be a place in medicine for the use of dicalcium phosphate in some conditions of recognized deficiency, there is certainly no place in rational and scientific therapy for a preparation marketed under such a name as "D.C.P. 340." The Council declared D.C.P. 340 unacceptable for New and Non-official Remedies because it is a preparation marketed under an uninformative name with unwarranted claims of therapeutic or prophylactic value. (Jour. A. M. A., June 3, 1933, p. 1767.)

EDITORIAL

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The Duluth Meeting

Our annual meeting held last month in Duluth proved most satisfactory, both from a scientific and an organizational standpoint. The attendance of more than 800 members shows the interest the profession is taking in the ever improving programs.

The annual meeting is the occasion for the reception of the committee reports of activities during the year, so many of which have to do with economic affairs. Most of the long hours of deliberation by the Council and House of Delegates were devoted to so-called medical economics. And well does this subject merit the concentrated attention of county, state and national medical organizations. The past few years have brought forth numerous proposals tending to alter medical practice radically. The present individual relationship existing between patient and physician which includes free choice by the patient of his physician, a relationship which the profession as a whole, and, we believe, the American citizens as a whole, insist upon, is in danger of being disrupted. All innovations in economic phases of practice must be judged from this viewpoint.

The Committee on Medical Economics of the American College of Surgeons drew up certain pronouncements favoring the trial of prepayment methods to provide for the payment of medical costs and gave them publicity just before the American Medical Association meeting in Cleveland. While the recommendations of the committee of the College were rather general and the term insurance was not used, virtually insurance, to be provided not by insurance companies but by some non-specified agency organized on a non-profit basis, was advocated. Inasmuch as the whole subject of insurance covering the cost of medical care is so involved, the American Medical Association took violent exception to any society of specialists speaking for the entire profession of the country. Certainly the American Medical Association should be the organization to propose changes in medical practice. The stand of the American Medical Association was approved by our State Association.

In this connection it will be interesting to observe developments in Michigan, for the insurgent Michigan State Medical Society is seriously considering a widespread plan for providing medical insurance for families with low income.

The institution of medical relief by the FERA was considered important enough to warrant the appointment last year of a special State Committee on this activity. The uncertainty of the permanency of the FERA merits continued close attention on the part of the profession. Although only about 1 per cent of relief funds in the state have so far been allocated to medical relief, the small fees accepted by the profession, while doubtless in many cases serving to tide over a certain number of practitioners, should not be allowed to form a basis for a permanent arrangement. Our State Association secretary is to have an assistant whose attention will be devoted to the operation of the FERA throughout the state.

A study was made by the Committee on Medical Economics of the malpractice situation in the state, and this study is to be continued. Insurance premiums have increased considerably but seem to be justified as there has been a marked increase in malpractice suits in the state in recent years. It was reported that one of the

three companies doing most of this insurance business in the state has had 216 cases on their hands during the past five years. One company showed a deficit of $41,000 in a recent two-year period. If this state of affairs continues premiums will have to be increased or the insurance companies will cease operating. The cases seem to be grouped about a rather limited number of lawyers and physicians. Any thoughtful physician must realize the inherent possibilities for innumerable suits in the practice of medicine, even when a patient is given service consistent with good practice. Any physician guilty of fomenting an unjustified malpractice suit and testifying against his fellow practitioner is despicable. Apparently the attitude of juries towards insurance companies is much the same in malpractice suits as in automobile liability cases.

Another problem which came up at the State meeting is the dilemma of the State Board of Medical Examiners. The efficient work of this board is going to be hampered in the near future by lack of funds. The fund established by the larger registration fee required the first two years following the enactment of the Basic Science law is rapidly becoming depleted. Legislative appropriation or an increased registration fee will be necessary to continue the good work of this board.

An innovation in constructive prevention of morbidity and mortality in disease will be the publication of a pamphlet by the State Association to assist physicians in treating diabetic patients. An analysis by the Diabetic Committee of the Association has shown a marked increase in the incidence and mortality of the disease in the state in spite of the discovery of insulin. Many unnecessary deaths occur each year due to lack of medical advice and insulin. Each member of the State Association will receive a copy of the pamphlet which is designed for the patient to follow under the physician's direction, and additional copies will be obtainable at a nominal price. The pamphlet should simplify the treatment of the diabetic patient, which has been needlessly complicated in the past.

Observation of the Duluth session indicated that our Association is energetically giving attention to medical problems in the state in an effort to provide the best medical care for its citizens and to safeguard the interests of the profession.

Dr. Coventry, our newly elected president, with his natural ability and years of experience in State Association affairs, can be counted upon to carry on the progressive spirit of our organization.

One Hundred Million Guinea Pigs

The book with this ingenious title has been much read. The more it is read the better. Much of its contents is known to the profession as a result of the work of the Council on Pharmacy and Chemistry and the Committee on Foods of the A. M. A. There is enough in the volume, however, which is not known to the average medical man to warrant the reading.

The backbone of advertising is the honest presentation of goods to the consumer. Advertising's backbone is in danger of being broken. This fact has justified the Consumers' League, which has come into existence to furnish an unbiased judgment on the value of commodities. The book mentioned is by two directors of the League and the enormous fund of information gathered by the League has been drawn upon to call the attention of the public to the dangers lurking in everyday foods, drugs and cosmetics.

The Federal government has always given more attention to the welfare of live stock than to United States citizens. Perhaps the human animal is supposed to have enough intelligence to care for its own welfare. In this complicated civilization of ours, however, we expect governmental protection where we buy food, drugs or cosmetics. Are we getting it? Apparently not.

Most individuals know that arsenic is poisonous. They do not know what strength of arsenical insecticide is safe for spraying apple trees and that apples are actually sold in the American market which are barred from foreign countries because too much arsenic is present on the skins of the fruit. Nor do they know that the regulation as to the strength of such insecticide established as safe by the Food and Drug Commission is not enforced. The same situation exists as to the sale of dried fruits treated with sulphur dioxide.

The patent medicine industry was supposed to have been dealt a death blow years ago. Nothing is farther from the truth. Millions of dollars are still extracted from the public for what are in the main useless remedies. The advertising of many of these remedies is so misleading and sometimes actually false that it is nauseating to

the medical mind. Doubtless the most harmful phase of such advertising is inducing the public to employ useless remedies for serious diseases.

The case of mercurochrome is taken up in detail in the volume mentioned. When mercurochrome first appeared it was heralded as the long-sought drug which would kill bacteria and spare living cells. Its uselessness as an intravenous antiseptic soon became evident. The medical profession has doubtless been led to place too much reliance on its local antiseptic power in weak aqueous solutions. It certainly is no substitute for the tincture of iodine.

It is probably not known generally in medical circles that impure ether has been sold to hospitals for anesthesia. Apparently, too, there was something to the accusation that rotten ergot was allowed by the authorities to be imported for medicinal use—a procedure to which our attention has been repeatedly called by one Armbuster.

Several instances of poisoning from cosmetics have been reported in the medical journals. Certainly there is no argument but that depilatories containing thallium and such cosmetics as Lashlure should be barred.

The volume contains plenty of evidence of the need of more active supervision of the manufacture and sale of foods, drugs and cosmetics. The contention is that the consumer and science should form the basis for the necessary regulatory laws rather than the business interests. A registry is proposed where approval must be obtained as to ingredients and labelling before an article can be sold. Naturally such a proposal will meet considerable opposition.

The medical profession knows too well the wastefulness of self medication and the actual danger in the unrestricted sale of dangerous drugs such as alpha dinitrophenol. A perusal of this book emphasizes the need for a change in the federal control of the manufacture and sale of not only drugs but of such articles as affect the health of the public.

ANTIPNEUMOCOCCUS SERUM

The Council on Pharmacy and Chemistry reports that there has been brought to its attention evidence that with improved preparations and technic the experimental use of antipneumococcus serum containing Type II antibodies or of preparations containing this antibody in combination with Type I is justified.. The Council therefore voted to consider the acceptance of these preparations, and voted to inform firms manufacturing the antipneumococcus serum of this decision. (*Jour A. M. A.*, December 16, 1933, p. 1968.)

Of General Interest

Dr. A. E. Benjamin of Minneapolis has announced that Dr. Edwin G. Benjamin has become associated with him in practice at 1727 Medical Arts Building.

Dr. Charles Betlach is taking a fellowship in anesthesia at the Mayo Clinic following the completion of his interneship at the Minneapolis General Hospital.

Dr. Jan Tillisch is taking a fellowship in internal medicine at the Mayo Clinic following his interneship and a year in medicine at the Ancker Hospital, Saint Paul.

Dr. Archie Olson of Hendricks, Minnesota, has been awarded a fellowship in the eye, ear, nose and throat department of the University of Chicago, where he is now located.

Dr. Wallace Merritt, following a year's residency in medicine at the Ancker Hospital, Saint Paul, began practicing July 1 at the Gamble Clinic in Albert Lea, taking the place of Dr. Ross Gamble, who recently died.

Dr. Leonard J. Monsoń of Canby, Minnesota, following the completion of his interneship at the Minneapolis General Hospital, is practicing in association with Dr. Peter E. Hermanson at Hendricks, Minnesota.

THANKS TO THE DOCTORS

Commercial exhibitors reported a great many actual sales and a great deal of interest in their products displayed by doctors who attended the annual meeting of the Minnesota State Medical Association. They were particularly gratified by the attention given them by medical visitors from out of the state.

In any case, thanks are due to all of the doctors who took the trouble to spend a portion of their crowded time in Duluth with the commercial exhibitors.

A large and well satisfied section of commercial exhibits goes a long way toward making a successful scientific meeting. Such a section is already established and is growing rapidly for the state meeting in Minnesota.

LASH-LURE

A number of cases of severe poisoning, including one case of blindness, have been reported from the use of a so-called "Eye Brow and Lash Dye" sold by a Los Angeles concern under the trade-marked name "Lash-Lure." The indiscriminate distribution of dangerous drugs by irresponsible persons again emphasizes the need of an extension of the powers of the National Food and Drugs Act. Lash-Lure, according to the A. M. A. Chemical Laboratory, contains a dye of the aniline type. The dangers of using hair dyes of the aniline type, even on the hair of the scalp, is well known to all reputable beauty parlors, and usually such dyes will not be applied if the patient exhibits any sensitivity to the substance. Yet in Lash-Lure we have a potentially dangerous product sold to be applied to the eyelashes. Whether the victims of this preparation have redress at law against either the exploiter of Lash-Lure or the individual beauty parlors responsible for applying it is a matter for the courts to decide. However, money is a poor recompense for the loss of sight. (Jour. A. M. A., September 23, 1933, p. 1016.)

MEDICAL ECONOMICS

Minnesota Leads

Wisdom, discretion and complete harmony marked the 1934 deliberations of the House of Delegates of the Minnesota State Medical Association at Duluth.

Momentous questions of social policy that will profoundly affect not only medical practice but the public weal in the next important years received prompt and thoughtful action at that meeting.

Sessions were disciplined, orderly and peaceable—a state of affairs that pleasantly sets apart the deliberations of organized medicine from those of certain other distinguished professional associations in which the social changes of the last few years have produced only turmoil and disagreement.

Medical men well realize that in order to prevent inroads of influence that would injure the best interests of medicine and would lower present standards, a united front is necessary.

On the basis of the conduct of its House of Delegates in Duluth and its conspicuous achievements of the last ten years, these things may truly be said of the medical profession of Minnesota:

It has steered a straight and clear course in the midst of temptation and distraction.

It works in an orderly manner for common purposes and the public good.

It is now leading all of the states in the United States in the legal protection it has secured for maintenance of professional standards and prevention of licensure for unqualified healers.

For testimony as to Minnesota's leadership in these matters the reader is referred to public statements made by the following distinguished visitors to the meeting: Dr. W. L. Bierring, Des Moines, Ia., president of the American Medical Association; Dr. W. D. Haggard, Nashville, Tenn., former president of the American Medical Association; Dr. F. J. Crockett, past president of the Indiana State Medical Association.

Passed by the House

In two crowded sessions, the House of Delegates considered an unprecedented amount of important business at Duluth.

Outstanding were the following actions, approved by the Council and confirmed by the House:

1. Unanimous endorsement by resolution of the American Medical Association's stand on health insurance—its famous ten point platform for the measure of all medical practice—its rebuke of subsidiary organizations such as the College of Surgeons for taking independent action on social and economic matters in opposition to the expressed will of the majority of physicians of the United States.

2. The decision to engage a full time field representative of the association, to contribute to the smooth operation of State Emergency Relief Program as it affects the doctors who are doing the work.

Diabetes Pamphlets Approved

3. Decision to publish 10,000 pamphlets on diabetes at the association's expense. These pamphlets have been prepared under the direction of the Committee on Diabetes. They will be distributed to members throughout the state and, through them, to diabetic patients.

Object: To cut down the rising death rate from diabetes, through better education of diabetic patients in the routine control of their disease.

Many other important problems were discussed and essential action taken.

In general, this session left nothing to doubt as to the stand of the Minnesota State Medical Association on the subject of socialization of any sort in the practice of medicine. Organized medicine went away from Duluth prepared to stand firmly by its traditions and to go steadily forward on the lonely but distinguished course demanded of it by the nature of its public service.

It went out from Duluth, also, determined to carry on any essential burden, alone and without aid, if necessary, rather than accede in the slightest degree to socialistic experiment.

Resolution to Back the A. M. A.

The House of Delegates of the Minnesota State Medical Association assembled, heartily endorses the sentiments and principles expressed by the action taken at the recent meeting of the House of Delegates of the American Medical Association at Cleveland in which were clearly stated the fundamental principles which should govern the practice of medicine both now and in the future as formulated in the (1) Ten Points and (2) the resolution that the American Medical Association is the proper body to legislate for and control the forms of medical practice.

We further approve the resolution passed by the House of Delegates of the American Medical Association condemning any attempt on the part of any scientific medical organization whose members are also members of the American Medical Association to dominate or control the nature of medical practice.

Medical Field Worker

A suggestion that a medical field worker might be needed to supervise the machinery of emergency medical relief was made some time ago in these columns. The need for such a functionary was emphasized by the exhaustive report submitted by Chairman N. O. Pearce of the Committee to Contact the State Relief Administration in which the dissatisfaction of officials of the relief administration with some aspects of the present program was specifically cited.

The mission of the field representative, determined upon by the House of Delegates, will be to keep in constant touch with the relief administration on the one hand, and with the doctors all over the state on the other; to avoid unpleasant misunderstandings; to assist in making necessary local adjustments and, in general, to oil the machinery of medical relief so that the most efficient and satisfactory care will be available to relief families with the least possible expenditure of money by the government and the least friction on the part of anybody who is a party to the program.

The successful working of this medical relief program may well mean the preservation, against odds, of our ancient American traditions in medical practice.

For Information on Relief

Every doctor who is doing relief work in Minnesota is referred for a complete, well considered review of the New Deal relief program as it affects health and medical practice to the forty page report of the Committee to Contact the State Relief Administration.

All of the figures for expenditure of relief money for medical care are available by month and by county in that report; also the plan of operation as outlined in federal bulletin No. 7, together with explanations and interpretations. The report contains a brief account and estimate of every phase of the program that in any way involved physicians—CCC camps, CWA, Transient Camps, the Child Health Recovery program. It will be printed soon in MINNESOTA MEDICINE.

With the information provided in this report and a special medical representative in the field, available to iron out any special differences that may arise between physicians and relief workers, the prospect is bright for smooth, efficient and satisfactory medical relief in the next year.

Future Developments

The Committee on State Health Relations, reporting on the general state of care of indigent in the state, looks forward to several years in which this emergency medical program will take the place of any local arrangements between county commissioners or town boards and physicians for care of the poor. Chairman Theodore Sweetser of Minneapolis hopes that the experiences of these years will lay an excellent background for much better local relations and local arrangements when the emergency is over and federal relief money is withdrawn.

Thanks to the action of the House of Delegates at this meeting, every possible step will be taken to realize this hope, and to avoid ugly quarrels over medical service and its price with laymen—quarrels that cannot avoid damage to the cause of good medical practice and practitioners, no matter where the rights in each individual altercation may lie.

Education for Diabetic Patients

Decision to publish the diabetes pamphlet of the Committee on Diabetes illustrates an interesting and important new phase of association work.

The formation of special state association committees for the promotion of special public health problems is not new. There have been cancer and heart committees for many years.

But with the formation of the Committee on Diabetes under the enthusiastic chairmanship of Dr. Russell M. Wilder of Rochester a year ago, this particular phase of the work of organized medicine in Minnesota took on a new life.

There is no better agency and there are no better facilities available for public health education than those of medical organization.

It is axiomatic that the doctor himself is the best informed public health teacher. Yet how often such problems as that presented by the rising diabetes death rate are neglected by the doctor! And by his neglect the field is left wide open for lay societies to function.

In Medical Hands

It is greatly to the credit of the association and the new Committee on Diabetes, that leadership in the public health campaign to control diabetes is now definitely in medical hands and will remain so.

Diabetes now occupies tenth place among causes of death in Minnesota. The death rate per one hundred thousand has increased from 16.40 in 1915 before the discovery of insulin to 22.37 in 1932 and the rate is rising faster than the cancer or the heart rates. These astonishing figures were read to the convention by a committee member, Dr. W. A. Stafne of Moorhead.

The trouble is with doctors as well as diabetic patients. The doctors do not always sufficiently instruct and advise their patients on the daily regimen essential to control of diabetes.

They Rely on Quacks

The patients, on the other hand, either fail to seek legitimate medical attention entirely, putting their faith tragically upon patent medicines or quacks, or they fail to carry out the doctor's instructions. Sometimes they are too poor to buy insulin.

Insulin can now be secured for relief families who need it, through the doctor who treats them under the plan for emergency medical relief.

The best attack upon the problem to teach diabetic patients how to control their disease was thought by the committee and the House of Delegates to be a pamphlet written in plain, untechnical English which

the doctor could put in the hands of his diabetic patients.

The proposed pamphlet will be in the hands of the printer shortly. Ten thousand of them will be printed for distribution without charge to members of the association. Those who want additional copies when the original ten thousand are exhausted will be able to secure them at small cost through the association.

Preventing Deafness

The Committee on Prevention and Amelioration of Deafness, organized a year ago, is attacking the neglected problem of deafness among school children.

Like the Committee on Diabetes, this committee is stepping in to take the lead in essential public health work. Its program for finding the children with impaired hearing in the schools has already begun, in cooperation with school authorities, and under the direction of its chairman, Dr. Horace Newhart of Minneapolis. The committee and its work received the enthusiastic endorsement of the House of Delegates at Duluth.

Limiting Physicians

How shall we approach the difficult problem of limiting the number of physicians licensed each year to practice in Minnesota?

In its report offered to the House of Delegates at Duluth the Committee on Limitation of Medical Licenses made the guarded recommendation that the Legislative Committee, if it should make any attempt to change the present statute governing the State Board of Medical Examiners, might promote the incorporation of a clause giving the Board discretionary powers as to the number to be licensed to practice medicine each year in the state.

The Reference Committee, backed by the House of Delegates, hesitated to go on record favoring the recommendation. It was inclined to agree with Dr. F. J. Savage, president of the association, who took occasion in his president's address to point out emphatically that limitation should begin before candidates for license approach the licensing board. The House of Delegates referred the report and recommendation back to the committee with instructions to confer with the Committee on University Relations and the Committee on Public Policy and Legislation for further study and a report next year.

Interesting figures presented in the report:

Two thousand, nine hundred twenty-six doctors are licensed to practice and register annually in Minnesota (474 of these live in bordering cities in neighboring states).

In addition, 4,681 doctors are licensed to practice in Minnesota but live outside the state and do not register annually. These men, if alive and well (many have been traced to other states, Canada, Europe) could move back to Minnesota to practice at any time.

In 1930 (peak year since 1927) 201 physicians were licensed to practice.

In 1934 the total had dropped to seventy-three.

The committee says: "Inasmuch as the ratio of physicians to population in Minnesota is even now more than adequate, a figure not exceeding the present ratio should be maintained."

In view of the fact that the number of licentiates has been greatly reduced in the past year, and since so many factors are involved in this problem, the Reference Committee rightly hesitated to approve any drastic recommendation at this time.

Malpractice Suits

A general increase in malpractice insurance premiums was reported by Dr. B. J. Branton, of Willmar, committee member, as part of a study of the subject made under the committee's auspices.

Insurance companies amply justify the increase on the unquestionable and disturbing increase in the number of malpractice suits.

Dr. Branton: "Thorough familiarity with all the laws governing medical practice on the part of physicians would help materially to cut down the number and size of verdicts.

"Good work, constant study, post-graduate courses to become better practitioners, eliminate many chances for the bringing of malpractice suits."

Loyalty to each other on the part of physicians and a disposition to unite in defense of the defendant in such an action whenever such a defense is not unethical and impossible was urged by Dr. Branton.

The Reference Committee and House of Delegates rejected a recommendation to the effect that members in good standing of the state association should be subject to censure or expulsion if they testified against other members in a malpractice action. They based their objection on the fact that situations may arise in which one member can not avoid appearing against a fellow.

The recommendation, offered in the form of a resolution, was withdrawn.

Group Insurance

Group annuities and group life insurance are not feasible for members of medical associations, according to Dr. J. F. Michael of Minneapolis, committee member, reporting on these forms of insurance. Neither are health and accident insurance or pre-payment hospital insurance.

"Pre-payment hospital insurance is disapproved on principle in many quarters, especially for medical groups. No recommendation is made."

For Medical Preparedness

The following recommendations by the Committee on Military Affairs were endorsed by the Reference Committee and accepted by the House of Delegates.

1. That an active committee be appointed to contact the younger men in the county societies and those young men just coming in to the county societies and urge them to apply for appointment to the medical reserve. . . .
4. That physicians, having applied for commissions be encouraged to perfect themselves through the cor-

respondence courses authorized by the Medical Corps so that they may advance in proficiency and rank. This in order that we may have an active and trained medical personnel for a national emergency.

"The civilian physician is the only one who imagines that he can step directly from civilian life into the army and be efficient in the practice of his profession," said this committee. "The only place where the two are allied is in the wards and operating rooms of Base Hospitals. In all other branches the civilian physician is a total loss."

No Action on R.O.T.C.

Two other recommendations involving endorsement by the medical profession of the retention of the R.O.T.C. at the University and also a study of the advisability of re-establishing the Medical Department in the R.O.T.C. were referred back to the committee on the advice of the Reference Committee. These are matters, in the opinion of the Reference Committee, on which our Association can take no action.

Committee Functions

The Minnesota State Medical Association is rapidly outgrowing the committee structure that served it admirably for many years.

A Committee to Study the Functions of Committees was accordingly appointed by the Council last February and reported at Duluth. At its recommendation, the House of Delegates empowered the Council to make changes.

These changes look toward the coördination of the functions of several committees, elimination where there is duplication, and a better definition of purposes and functions.

It is suggested, for instance, that all committees appointed by the president terminate with the expiration of his office. All new committees, not authorized in the constitution and by-laws, should terminate also, unless otherwise authorized by the House of Delegates.

Standing committees necessary to carry on the continuous work of the Association are to be created by the Council and new appointments to these committees are to be made by rotation at stated periods.

Lines Should Be Drawn

It is especially recommended that a sharp line be drawn between scientific and other committees and that a Committee on Economics be appointed by the Council to consist of five members and to supervise the work of all committees to study economic problems of any sort (the Committee on Limitation of Medical Licenses, et cetera), these latter committees to be subdivisions of the supervising Committee on Economics.

Another important change asked by the Committee was to make the position of Secretary of the Association officially that of general manager of arrangements for the annual meeting. The Secretary is therefore to be officially responsible for housing, promotion, for all exhibits—scientific, technical, commercial—and for the Scientific Cinema, coöperating, of course, with such members as he may select as assistants and advisors.

By the same alteration, the Committee on Scientific Assembly becomes responsible for the scientific program, alone.

Affiliate Members

At present there are seventy-seven affiliate members of the Minnesota State Medical Association.

They represent a reduction in income of $1,155.00.

Forty-two members will be seventy years of age and eligible to affiliate membership within a short time. In addition, there are fifty-three members who are now between sixty-five and sixty-nine years of age and will be eligible within the next five years for affiliate membership.

If all the members now over sixty-five apply for affiliate membership the income of the Society will be reduced another $1,425, making a total of $2,580, less the cost of sending these affiliates MINNESOTA MEDICINE.

This is a sizable drop in income and may necessitate an increase in the dues of active members.

The above figures were submitted to the House of Delegates by the Committee on Affiliate Membership. The Committee recommended:

1. That a year's further study be put upon the whole question before any definite action to change the age of eligibility to affiliate membership be taken.

2. That affiliate membership be regarded, in the meantime, as an honorary membership, not as an automatically accruing privilege for all who reach a certain age.

That the question of precise age limit is secondary to the fostering of this sentiment concerning affiliate privileges.

Minnesota State Board of Medical Examiners

Duluth Pharmacist Found not Guilty of Practicing Healing

State of Minnesota *vs.* Sophia Stryboya, also known as Sophia Stryboya Sikoparija

Mrs. Sophia Sikoparija, who operates a drug store on Commonwealth Avenue in that portion of Duluth known as Gary, was found not guilty by a jury in the Court of the Honorable E. J. Kenny, Judge of the District Court, on May 28, 1934.

The information filed against the defendant charged her with examining and suggesting a form of treatment for one Mrs. Zorka Griak, who also lives at Gary, and that this was done for a fee or compensation. Mr. and Mrs. Griak, who were witnesses for the State, testified that the defendant on two occasions took the temperature and pulse of Mrs. Griak. This was denied by the defendant, who admitted selling to Mr. and Mrs. Griak the fourteen items of pills, powders and liquid medicines that were introduced in evidence, but contended that they were sold either on a prescription or

on a written slip presented by the purchaser calling for the specific articles.

Judge Kenny, in his charge to the jury, stated that in so far as doing those things which the Basic Science Law defines as the practice of healing "a pharmacist is in no different position than a layman, and cannot do those things any more than a layman can."

Northwest Hair Clinic Incorporated, Dissolved

On June 4, 1934, the Honorable Arthur W. Selover, Judge of the District Court for Hennepin County, made an order dissolving the Northwest Hair Clinic, Incorporated.

This clinic had been incorporated in 1932 for the purpose of owning and operating "beauty shops and hair and skin clinics" (MINNESOTA MEDICINE, June, 1934, page 353). The corporation advertised extensively that its work was done under "strict medical supervision."

On June 15, 1934, a certified copy of Judge Selover's order was filed with Mike Holm, Secretary of the State of Minnesota, which terminates the corporate existence of this corporation.

Unlicensed Chiropractor Pleads Guilty to Violating Basic Science Law

State of Minnesota *vs.* Willits

On July 9, 1934, Charles A. Willits, Maple Plain, Minnesota, entered a plea of guilty to practicing healing without a Basic Science certificate before the Honorable Mathias Baldwin, Judge of the District Court at Minneapolis. Judge Baldwin, after ascertaining the facts, sentenced the defendant to ninety days in the Hennepin County jail, but stayed the sentence for one year upon the condition that the defendant absolutely refrain from practicing healing unless he is properly qualified and licensed to do so.

The defendant, a middle aged man, claims to be a graduate of a chiropractic school at Davenport, Iowa. He informed Judge Baldwin that he was licensed to practice chiropractic in the State of Wisconsin, but not in Minnesota. The defendant formerly lived at Superior, Wisconsin, but for some time has been living on a small farm just south of Maple Plain in Hennepin County, Minnesota. Willits admitted to the Court that he had been treating people for various ailments, and that he had received compensation for his services. When the defendant was questioned by the Court as to why he had not taken the Basic Science examination, he replied that he did not have a high school education and therefore was disqualified under the law.

Albert Lea Chiropractor Pleads Guilty to Violating Minnesota Basic Science Law

State of Minnesota *vs.* Hale

J. F. Hale, forty-five years of age, entered a plea of guilty on July 11, 1934, to a charge of practicing healing without a basic science certificate, before the Honorable Norman E. Peterson, Judge of the District Court at Albert Lea. Hale, who recently came into the State of Minnesota from Iowa, claimed that he graduated in December, 1933, from the Palmer School of Chiropractic at Davenport, Iowa. However, he passed over very lightly the formality of taking the Basic Science examination and proceeded to practice for several weeks at Glenville, Minnesota, and more recently at Albert Lea.

On July 7, 1934, a warrant was issued for his arrest charging him with practicing healing without a basic science certificate. At that time Hale maintained an office at 512 South Broadway, in Albert Lea, and had a large sign painted on his window "Hale—Chiropractor." When arraigned before O. F. Missman, Justice of the Peace, he demanded a preliminary hearing and informed the Court that he was a member of the Chiropractic Health Bureau. He also stated that they had legal counsel in Indianapolis, Indiana, and that they would defend him. Hale was given a hearing, held to the District Court under $500.00 bail, and placed in the Freeborn County Jail in default of furnishing his bail. After several days in jail Hale decided to plead guilty and was sentenced by Judge Peterson to pay a fine of $100.00 or ninety days in jail. Hale agreed not to practice in the State of Minnesota unless he was licensed and expressed a desire to return to the State of Iowa. Under these conditions Judge Peterson suspended the sentence and placed the defendant under probation to Sheriff Helmer Myre of Freeborn County, and he is to report to the District Court at Albert Lea on the opening day of the September, 1934, term. Hale seemed to be under a misapprehension that chiropractors who were arrested in Minnesota for practicing healing in violation of law, were permitted to continue to practice while they were awaiting trial. He was emphatically informed that such was not the case.

Splendid coöperation was shown in the handling of this case by Elmer R. Peterson, County Attorney of Freeborn County, and Helmer Myre, Sheriff.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for the Month

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of August will be as follows:

August 1—Crippled Hearts.
August 8—Price of Worry.
August 15—Infantile Paralysis.
August 22—Unseen Enemies of Children's Health.
August 29—How Radium Acts.

New State Officers

Dr. William A. Coventry of Duluth was elected president of the Minnesota State Medical Association at the 81st annual session of the association's House of Delegates at Duluth in July. Dr. Coventry will take office in January, succeeding Dr. F. J. Savage of Saint Paul.

Other officers elected at the meeting are: Dr. A. G. Chadbourn, Heron Lake, first vice president; Dr. E. S. Boleyn, Stillwater, second vice president; Dr. W. H. Condit, Minneapolis, treasurer (re-elected) and Dr. E. A. Meyerding, Saint Paul, secretary (re-elected).

Dr. B. S. Adams of Hibbing was elected to fill out the term of Dr. Coventry as councilor of the 9th district. Other councilors whose terms expired this year and who were re-elected for new terms are: Dr. H. M. Workman, Tracy, for the 3rd district; Dr. George Earl, Saint Paul, for the 5th district; and Dr. W. W. Will, Bertha, for the 7th district.

Next year's meeting of the association will be held at Minneapolis, the delegates decided. Preparations are already under way for the largest meeting in the history of the association.

A total of 1,500 physicians, Auxiliary members, nurses and exhibitors was registered at the Duluth meeting.

Olmsted-Fillmore-Houston-Dodge Society

A hobby show of the Olmsted-Fillmore-Houston-Dodge County Society was held last month at the Rochester Country Club. Each member was requested to display his special hobby and a novel exhibit was arranged on the clubhouse veranda of etchings, paintings, unusual photography, wood carving, sculpture, coins, pottery and guns.

Dr. Vinson's hobby of gardening was depicted by a figure of a man made up from a dark shirt, plaid plus fours, garden instruments protruding from the arms and legs of the garments, a spade being used for the head.

Dr. L. F. Sutton of Mazeppa exhibited a 200 year old Belgian print. Dr. C. G. Sutherland had his notebook containing records of stories heard.

Leica photographs, enlargements made from motion picture films, developed and mounted on large panels by Drs. D. M. Masson and A. H. Sanford attracted much attention. Considerable talent in oils was displayed in Dr. J. E. Crewe's exhibit of paintings, "Dr. Braasch's Home," "Scene on the North Shore," "Lake Superior Fog," and "View from Mrs. Kahler's Garden."

Dr. F. A. Willius' hobby was depicted by eleven pen and ink sketches of old streets, quaint architecture, home scenes and bridges.

Old coins from Europe, Asia and the United States enclosed in a glass case constituted Dr. A. M. Snell's contribution. This hobby had led him to collect also some old-fashioned warming pans.

Dr. M. C. Piper is interested in collecting pioneer relics and displayed an old millstone found on his grandfather's estate near Mankato, a grain shovel found near White Water and a solid walnut mould, hand made, used for casting metal wheels.

Quite a display of old firearms from Italy, Austria, Germany, Czechoslovakia, and elsewhere was presented by Dr. Louis B. Wilson.

Among the displays which should be mentioned was the collection of exquisite Chinese embroidery and clothing gathered by Dr. Walter H. Judd during his several years' sojourn in China.

A good number of members played golf in the afternoon, which was followed by dinner and dancing. The hobby show was in charge of Dr. Sanford and Dr. Piper, while the program was arranged by Drs. Snell, Pollock and Prangen. A committee of the Women's Auxiliary of the medical society, consisting of Mrs. F. P. Moersch, Mrs. O. C. Heyerdale and Mrs. L. M. Randall, assisted.

Wabasha County Society

The sixty-sixth annual meeting of the above named society was held at Lake City, on Thursday, July 5, 1934. There were twenty-five in attendance.

The program and entertainment committee consisted of Dr. R. C. Radabaugh, president of the society, and the four Lake City members. Dinner was served at Hotel Lyon, and a boat ride on Lake Pepin was given the ladies in attendance in the afternoon.

At the business session, the following officers were chosen for the coming year: President, Dr. R. C. Radabaugh, Hastings (re-elected); Vice President, Dr. C. G. Ochsner, Wabasha; Secretary-Treasurer, Dr. W. F. Wilson, Lake City; State Delegate in 1935, Dr. W. B. Stryker, Plainview; Alternate, Dr. D. S. Fleischhauer, Wabasha; Censor (for three years), Dr. W. J. Cochrane, Lake City.

It was voted to hold the next annual meeting at Wabasha.

Dr. E. W. Ellis of Elgin, a newly located physician in the county, was elected to membership.

Dr. F. J. Savage of Saint Paul, President of the State Medical Association, and Dr. H. Z. Giffin, of Rochester, Councilor for this district, gave talks covering subjects pertaining to the progress and welfare of the medical profession.

A resolution was passed providing for the proper marking of the grave of Dr. H. N. Rogers, a pioneer physician in the county, one of the charter members of the Wabasha County Medical Society, at one time a practitioner in Lake City, a veteran of the Civil War, who died at Farmington in 1926 and whose body now lies buried in Lakewood cemetery, Lake City.

At the scientific session the following program was presented:

R. C. Radabaugh, M.D., Hastings, President of the County Society, "Pioneer Medical Conditions in the County," "Fecal Impaction Following Cholecystitis."

F. J. Savage, M.D., Saint Paul, President State Medical Association, "The Work of the State Medical Association During the Past Ten Years," "Fractures of the Humerus."

E. Covell Bayley, M.D., Lake City, "Report of Operation for Strangulated Hernia on a Four Weeks Old Premature Infant."

J. Grafton Love., M.D., Mayo Clinic Staff, Rochester, "The Treatment of Head Injuries."

W. F. Wilson, Secretary,
Lake City, Minn.

Southern Minnesota Medical Association

The annual meeting of the Southern Minnesota Medical Association will be held August 13, 1934, at Mankato. The scientific program which here appears will be held at the Teachers College. Luncheon will be served at the College, to be followed by the annual business meeting. In the evening a banquet will be held at the Country Club, with addresses to be announced later.

The officers of the Association consist of Dr. M. C. Piper, President; Dr. S. A. Slater, Vice President; Dr. W. H. Valentine, Second Vice President; Dr. H. C. Habein, Secretary-Treasurer.

Scientific Program

8-9 a. m. Mankato Hospital. Clinics and demonstrations by Mankato Physicians.

9 a. m. Backache: E. T. Evans, Minneapolis
Discussion: L. W. Clark, Spring Valley
A. E. Benjamin, Minneapolis
Dysmenorrhea: L. W. Barry, St. Paul
Discussion: A. W. Sommer, Elmore
L. J. Stacy, Rochester
Abdominal Pain: Owen Wangensteen, Minneapolis
Discussion: L. A. Williams, Slayton
I. J. Schottler, Dexter
Headache: H. W. Woltman, Rochester
Discussion: W. L. Burnap, Fergus Falls
A. L. Vadheim, Tyler
Itching: L. A. Brunsting, Rochester
Discussion: J. F. Schaefer, Owatonna
J. K. Anderson, Minneapolis
Diarrhea: P. W. Brown, Rochester
Discussion: A. J. Chadbourn, Heron Lake
H. J. Lloyd, Mankato
Hematuria: Gilbert J. Thomas, Minneapolis
Discussion: A. E. Sohmer, Mankato
Ben Gallagher, Waseca
Irregular Pulse: A. R. Barnes, Rochester
Discussion: C. Koenigsberger, Mankato
C. B. McKaig, Pine Island

2 p. m. Surgery in Pulmonary Tuberculosis: T. J. Kinsella, Oak Terrace

The Management of Essential Hypertension: E. L. Tuohy, Duluth

Functional Disorders of the Gastro-Intestinal Tract: Arthur E. Hertzler, Halstead, Kansas

End-Results in the Malarial Treatment of Dementia Paralytica: Joseph C. Michael and Burton P. Grimes, Minneapolis

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TRANSACTIONS *of the* MINNEAPOLIS SURGICAL SOCIETY

ANNUAL SYMPOSIUM on CANCER*

Devoted to the Occurrence of Cancer in Private Practice in Minneapolis and the Available Means of Treatment

MEETING OF APRIL 5, 1934

The President, Dr. Kenneth Bulkley, in the Chair

Dr. J. Frank Corbett: Radium is recognized as a much used adjunct in the treatment of cancer and we have long felt the need of a survey of the available radium in Minneapolis for the treatment of private patients. Radium is used in the form of emanations and also in the small tubes of the actual radium salt which are designed for local application. We do not have a radium emanation plant in Minneapolis where emanations are available for the treatment of private patients although we do have a very nearly ideal emanation plant at the University of Minnesota Cancer Institute for the treatment of such patients as may enter the Cancer Institute. The facilities of this institute, however, are not available to the surgeons not connected therewith. Dr. Martin Nordland has been appointed Chairman of the Subcommittee to survey the available radium in private hands in Minneapolis and this survey has revealed a surprisingly large amount of radium in this community. Dr. Martin Nordland.

REPORT ON THE USE OF RADIUM AS AN ADJUNCT TO SURGERY WITH SURVEY OF FACILITIES FOR RADIUM THERAPY IN MINNEAPOLIS

Dr. Martin Nordland: The medical profession has begun to realize that radium has its place in the armamentarium of the surgeon, that surgery is a useful adjunct to radium therapy, and that, although treatment by radium alone has a definite place, much can be done by a combination of methods which cannot be accomplished by either alone.

Most of the malignant diseases for which radium is used have hitherto been treated by surgical means and it is of the greatest importance that the medical profession should realize where radium *can help*, where *supersede* and where *hinder* the surgeon. It is inevitable that in many instances radium therapy and surgery should overlap.

It is only within the past six years that the *knowledge of the physics* of radium has been brought to bear on the therapeutic measures. Because of this knowledge radium therapy has been put on a more rational basis, but much has yet to be accomplished before any rules can be laid down.

The knowledge of the reaction of certain kinds of tumors to roentgen rays and radium has led Dr. Desjardins to suggest a method for the identification and classification of tumors which, while not so broad as pathologic methods, may be useful. He cautions that in spite of the excessive faith of many physicians in competent pathologists, one cannot rely too blindly on their verdicts, particularly when conflicting with physical, clinical and roentgenologic data.

The method suggested is based on the fact that each variety of cell in the body has a specific range of sensitiveness to roentgen rays and radium. Although the cause for such specificity has not yet been determined, the sensitiveness peculiar to each kind of cell appears to be related chiefly to the natural life cycle of the cell. It has been noted, for example, that the lymphocyte, which has the shortest life cycle, is also the most radiosensitive, while the nerve cell, which has the longest life cycle, is also the most radio-resistant. Cells have

*Continued from the July issue.

been classified by Desjardins according to their radio-sensitiveness in the following order:

1. Lymphoid cells (lymphocytes).
2. Polymorphonuclear and eosinophilic leukocytes.
3. Epithelial cells:
   (a) basal epithelium of certain secretory glands, especially of the salivary glands.
   (b) basal epithelium (spermatogonial cells) of the testis and follicular epithelium of the ovary.
   (c) basal epithelium of the skin, mucous membranes and certain organs, such as the stomach and small intestine.
   (d) alveolar epithelium of the lungs and epithelium of the bile ducts (liver).
   (e) epithelium of tubules of the kidneys.
4. Endothelial cells of blood vessels, pleura and peritoneum.
5. Connective tissue cells.
6. Muscle cells.
7. Bone cells.
8. Nerve cells.

The radio-sensitivity of the epithelium of the skin is found about half way between the lymphocyte on the one hand and the nerve cell on the other. The different in susceptibility is sufficient to enable one to distinguish readily between the two.

Therefore, general rules can be laid down as to the effect of radiation on tissues which are sensitive to its action, since it is certain that tissues *vary in their sensitivity to radium.* The probable effect of radiation can be foretold if certain factors as to the structure of the tumor are obtained from biopsy.

Generally speaking, tumors in which the cells have great reproductive power (embryonic) are radio-sensitive while tumors in which the cells are highly differentiated are radio-resistant. A *clear distinction* must be drawn between a marked *radio-sensitivity* and *curability.* The non-differentiated radio-sensitive type spreads rapidly and gives rise to early metastasis with an associated grave prognosis. It is easy to cause clinical disappearance but recurrence is common.

An important factor in reducing radiosensitivity is *infection.* The reason for this is not known but radiation increases inflammation and the effect of treatment on an infected growth is often to induce a flare-up without effect on the tumor itself. In cases of carcinoma of the cervix, much is gained by preliminary local treatment. *Metastases* are also always more resistant to treatment than the primary lesion.

The *latent period,* that is the period between irradiation and changes in the tumor, varies within wide limits (hours to weeks). Whereas lymphoid cells are rapidly influenced by moderate irradiation and undergo more or less marked inhibition of mitosis and degenerative changes within from half an hour to three or four days, corresponding changes in epithelial cells are caused only by a much longer exposure to the rays and changes do not become apparent for a week or even longer. In this connection may be mentioned *delayed radium burns.* These are common in radio-resistant tumors. The burn appears as an ulcer surrounded by hard indurated edematous tissue and covered by an adherent offensive yellow gray slough. This should not be confused with the carcinoma.

The history of radium as a therapeutic agent is so short that it is not possible to describe the more recent advances that have been made without correlating them with the early story of radium. The story of radium begins with the discovery of radio-activity by Henry Becquerel in 1896, followed in 1898 by the discovery of radium by Monsieur and Madame Curie, who analyzed Becquerel's pitchblende further. They found that it contained some radio-active minerals three or four times more radio-active than could be accounted for by the uranium content. They concluded that the ore must contain some other substance. In 1898 they published the results of their investigation and claimed the discovery of a new element which they called radium. The announcement came on Christmas day and obtained for them a half share in the Nobel prize for that year.

The amounts of radium produced by early workers were infinitely small. Three grams annually came from Joachmisthal, Bohemia, which country set up the first radium monopoly. This amount was mainly used for experimental purposes and the price changed from $10,000 per gram in 1904 to $150,000 in 1910. The United States then began to produce the only radium available to the world from Carnotite mined in Utah and Colorado. A Pittsburgh capitalist, Joseph Flannery, whose sister had died of cancer, organized the Standard Chemical Company in 1912 and from that time until 1922 produced four-fifths of the world supply of radium. In 1913 ores rich in uranium were discovered in the Belgian Congo, but it was not until 1921 that the full importance of this discovery was realized and it was not until three years later (1924) that Belgium set out to break the radium market. By 1926 Belgium had complete control. From that time the price of radium began to fall, dropping from $170,000 to $50,000 per gram. Of the world's 700 grams or more, some 400 grams have been sold by the Belgians.

There has recently been discovered in Alberta, Canada, in the region of Great Bear Lake, an ore exceedingly rich in uranium. Great Bear Lake mines may kill the monopoly and shoot down the price of radium. The price may fall, but the probable solution is that Canada and Belgium will compromise on a price profitable to both and radium will remain a luxury for those who can afford to die expensively.

Quantity and Location of Radium.—The world, so far, has produced only about 700 grams (one and three-fourths pounds). Its great value makes its location, for the most part, possible.

Location	Grams	Grams
United States		
287 hospitals	90	
414 physicians	35	
9 laboratories	6	
Estimated private and industrial	107	
		238
Belgium		160
Czechoslovakia		55
France		51
England		42
Sweden		8
Denmark		4
Argentina		2
Unaccounted		140
Total		700

The State of Minnesota possesses 4,512.3 mgm. of radium while the private physicians and hospitals of Minneapolis have 945 mgm. According to the statements of authorities in France and Sweden, two grams of radium should be available for each million population or for each 1,000 deaths from cancer. Minneapolis, therefore, has sufficient quantity for its 500,000 people.

In common with most new and startling discoveries, radium therapy has suffered from over-enthusiasm on the part of its advocates and from hasty criticism by its opponents. This is especially true in its relation to cancer, where radium has been hailed by the lay press as a cure-all and the public encouraged to believe that it would do all things. While irradiation is a "treatment" that has a definite effect upon cancer, to date its effect has been slight, since 83 per cent of all cancer patients die from cancer. Radium in incompetent hands is a dangerous agent and may be as perilous as cancer itself.

We have with us tonight a group of men who have had considerable experience in the practical applica-

tion of radium. Dr. Charles R. Drake, Director of the Laboratory at the Swedish Hospital for a great many years, is known to most of you and because of his wide experience in the use of radium I would like to have him speak to you with reference to radium in uterine malignancy. I am pleased to introduced Dr. Drake to you.

UTERINE MALIGNANCY

DR. CHARLES R. DRAKE: Uterine malignancy is the most frequent primary malignancy occurring in women, being from 25 to 30 per cent of all such malignancies. These malignancies consist of carcinoma and sarcoma. Sarcoma is of such rare occurrence that it will not be considered in this discussion, although the treatment of sarcoma is essentially the same as that of carcinoma. Uterine malignancies occur most frequently in the fourth, fifth or sixth decades of life, but occasionally they occur between the ages of twenty and thirty and in the aged.

Uterine carcinomas may be classified according to one of three methods: (1) pathologic type; (2) degree of malignancy; (3) anatomic situation: (a) location; (b) extent of growth.

1. The pathologic types consist of: (1) the adeno-carcinoma; and (2) the epidermoid carcinoma. About 10 per cent of all uterine carcinomas are adeno-carcinoma and most of these occur in the fundus of the uterus. Less than 5 per cent of the carcinomas of the cervix are of the adeno-carcinomatous type. The epidermoid or squamous cell type of carcinoma rarely occurs in the fundus. In the cervix it varies in cell morphology to such an extent that it is rather difficult to adequately describe. Suffice it to say that all types of epidermoid cells may be found. The irregularity of growth is protean but all are malignant.

2. Based upon the inherent appearance of the malignant cells the carcinomata have been classified according to their malignancy (Broders' classification), grades one, two, three and four, grade one being the least malignant, grades two and three of moderate malignancy, and four, of the highest degree. However, in the treatment of malignancy, all grades must be considered potentially vicious and should be treated all alike.

3. The anatomic classification as formulated by the Cancer Commission of the League of Nations and reported by the Radiological Sub-commission of that body is substantially as follows:

Stage 1. The growth is limited to the uterine cervix. The uterus is freely movable.

Stage 2. The lesion spreads into one or more of the fornices with or without infiltration of the parametrium adjacent to the uterus, the uterus retaining some degree of mobility.

Stage 3.

(a) Nodular infiltration of the parametrium on one or both sides, extending to the wall of the pelvis with limited motility of the uterus or to full fixation of the same.

(b) Superficial infiltration of the vagina with mobile uterus.

(c) Metastatic growths in the pelvic nodes with relatively small primary growth.

(d) Isolated metastatic growth in the lower part of the vagina.

Stage 4.

(a) Massive infiltration of the parametrium on all sides.

(b) Carcinoma involves the bladder or the rectum.

(c) The vagina is infiltrated.

(d) Remote metastatic growths are present.

The above major classifications are of considerable value in the selection of the method of choice in treating uterine malignancies. The agencies at hand for such treatment consist of surgery, electric cautery, radium and high voltage x-ray. Primarily, the subject belongs to the field of surgery. In the consideration of the method of choice there must be the proper clinical consultation with the surgeon, the pathologist, the radium therapist, and the roentgenologist. Each case of uterine malignancy is an individual problem and should be treated as such regardless of the above classification and no hard and fast rules can be applied. The principle upon which successful cancer therapy is based is the complete eradication of the disease. Presence or absence of metastases plays an important part in this and may occur early or late. Metastases are not always demonstrable and, therefore, all treatment should be directed in such cases as though there were none, and, if they manifest themselves later, be treated accordingly.

Lord Moynihan recently summed up the value of radium and, of course, deep x-ray, in the following manner: "The surgeon's knife in the most highly trained hands is an instrument of great delicacy, but it cannot always discriminate between healthy tissues and diseased tissues. Radium is an instrument of far greater delicacy because its action is selective, that is to say, it acts differently upon the diseased and healthy tissues, killing the one and leaving the other. The difficulty of its application sometimes lies in obtaining access to the diseased parts when they are inside the body and in placing it in close relation to every particle of cancerous tissue where access has been obtained. Great advances have been made, and it is now true to say that certain mutilating operations have been virtually abolished, as, for instance, those concerned with the treatment of cancer in the mouth or on the tongue.

"Radium will gradually encroach more and more upon the field of surgery, but it can never entirely replace surgery, since it is not everywhere applicable. Where radium is applicable, its effect will always depend upon greater diagnosis of the disease so that greater success can only follow upon greater readiness of patients to present themselves for examination and upon the increasing skill of the medical profession in diagnosing the disease. It is a fair claim to make that the results up to the present are encouraging, but in the treatment of cancer we must always take the long view, and must seek to know what results are found, not in a few months' time, but at the end of not less than five years."

Adeno-carcinoma, which is probably the least malignant and which is usually confined to the fundus of the uterus, is best treated surgically by complete hysterectomy, followed by a radium pack in the vagina and by deep x-ray therapy. In those patients who are poor surgical risks or those who refuse operation, the insertion of radium tubes, containing in the aggregate 100 milligrams in tandem so as to cover the entire uterine mucosa for a period of 30 to 36 hours, is advisable. This can be repeated in eight or ten weeks by a dose of equal amount for twenty-four hours.

Epidermoid carcinoma of the cervix is probably best treated by radiation. Some workers have advocated post-radiation hysterectomy to be done in early and selected cases. Other workers have classified carcinoma of the cervix as operable, border-line, and inoperable, but have advocated radium in all. Moynihan's dictum should be followed in carcinoma of the cervix because of the difficulty of complete eradication by operation and because of the penetration and selectivity of radium.

The radium treatment of carcinoma of the cervix has been done generally in two ways: (1) smaller amount of radium over a longer period of time; or (2) a large amount of radium for a shorter period of time. This latter method consists of one heavy treatment at one sitting followed two or three months later by a second prophylactic treatment of lesser amount. The latter method is the method which I prefer as it requires less inconvenience and less expense to the patient. One should hit hard while the hitting is good.

The application of radium should consist of from 100 to 150 milligrams to be used for thirty to thirty-six hours, giving a total of 3,000 to 4,500 milligram hours (mgh.). The radium should be in 25 and 50 milligram tubes, screened with bronze and rubber. If possible, one tube should be inserted into the cervix beyond the inner os, another tube should be placed directly in the cervix, and the other tubes should be placed horizontally across the cervix in front. This gives good cross-firing through the entire area involved. The radium tubes should be held in place by gauze packs and occasionally sutures may be used. The packs should be placed plentifully against the bladder and the rectum. Laterally there is not so much need of screening. The gauze makes the best screen by reason of distance obtained to prevent the burning of the tissues. Each case is a separate problem and the arrangement of the tubes and gauze is made accordingly. The main thing is the close approximation of the radium to the malignant areas. It is at this point that the pathologic classification comes in and is of value in determining the success of the treatment. Some workers have used radium needles or implants of emanations but the tissues are hard to get at with needles. It is hard to properly place the needles and the tissues act too greatly as a screen for deep penetration. Furthermore, the cautery effect is too great. The most effective radiation is the gamma ray radiation and this is obtained from the radium in tubes.

All carcinomata of the uterus are not cured. Many of them are cured. The percentage of cures varies with the methods employed and also with the stage of the case at the time of the treatment. All cases should be thoroughly treated largely in the same manner, as some of the worst in appearance, both clinically and microscopically, are the most amenable to treatment and cure. Likewise, grade four carcinomata show much amelioration with the clearing up of foul discharges and the prolongation of life.

Associated with the use of radium in the treatment of uterine malignancy is the use of deep x-ray therapy. This has been discussed in a previous paper. I wish to emphasize the value as an additional means of crossfire radiation. It should be used in most cases of uterine malignancy as an additional weapon to obtain a cure.

The measure of success of any method depends upon the end-results. The results of radiation therapy should be determined by the record of cures and the prolongation of life, the analysis of such records and statistics depending upon the type and the stage at which the treatment was started. Present statistics are accumulating rapidly which are showing the marked value of radiation therapy in uterine malignancy. The best results are obtained where careful consultations are held by the surgeon, the pathologist, and the radiologist.

DR. MARTIN NORDLAND: The benefits of radium have been frequently discussed but many of us have never thought about the dangers in the uses of radium. Dr. A. S. Fleming from the Hillcrest Hospital is well qualified to discuss this subject. We will now hear from Dr. Fleming.

DANGERS IN THE USE OF RADIUM

DR. A. S. FLEMING: Of the several methods used in the treatment of cancer today, surgery, x-ray and radium, I think it may be safely said that radium is as free from danger as any. There is little, if any, immediate mortality. There is less shock or intoxication and the success following its use in certain types of cancer leads to the hope that its field of usefulness may be extended as our knowledge and skill in its application increases.

Used as a palliative measure in the recognized hopeless and inoperable cases, it brought about such surprising and gratifying results that today no case of cancer should be denied the opportunity of receiving treatment by this potent agent that has the slightest chance of survival in the light of our newer knowledge.

On no subject in connection with the treatment of cancer is here more misinformation abroad than with reference to radium. One error very generally met with concerns the effect or danger of light or insufficient treatment in bringing about stimulation of the growth and hastening metastasis. This idea is not only entertained by the layman but also very generally by the medical man. This notion is on a par with the fear of the surgeon's knife and the taking of sections for biopsy. The effect of Gamma radiation on the malignant cell is always one of inhibition, either temporary or complete destruction. It never stimulates.

The criticism that should lie against light or insufficient radiation is not that it stimulates the growth of malignant cells but that the one opportunity that the patient may have of cure may be lost by the temporary relief that may follow. There never will recur as good an opportunity for successful treatment of the growth as when it is first discovered. The first course of treatment should be to the limit of normal tissue tolerance. If that is done, says Dr. G. E. Pfahler of Philadelphia, many more of our patients will recover than if we try to give as little radium as possible.

On a par with the above misconception is the prevailing opinion that the application of radium is an extremely simple process and that anybody can do it. This is the cause, according to the observations of Dr. Ward of the Women's Hospital in New York, of a great deal of unnecessary suffering in the forms of various complications. He says that Dr. Regaud of Paris has stated very aptly "that it is necessary to have much experience to obtain from this method of treatment all of the good that it may give without the evil it may do."

Radium is a very potent substance. Anyone aspiring to give radium treatments should know as much as possible of its physics and chemistry, and of its biological effects, its limitations and its suitability to the particular case in hand. Every case of cancer is an individual problem and no one treating cancer should be so wedded to one line of treatment that it is applied indiscriminately. The use of surgery, radium and x-ray, one or all combined, may be needed to secure the best results.

There is one danger that I think should be called to your attention, and that is the advertisement of the Commercial Radium concerns telling how to cure cancer with the aid of their radium which they will supply with the advice of their expert in radium dosage and technic. This practice and insidious appeal, I think, should not meet with your approval. The treatment of cancer by remote control is not the best treatment.

DR. MARTIN NORDLAND: It is a question whether the discussion of malignancy of the skin should be included under the division of radium therapy. We will let the next speaker decide this question for you. I take great pleasure in introducing Dr. S. E. Sweitzer.

SKIN MALIGNANCY

DR. S. E. SWEITZER: In the first place, I want to emphasize that you must make a diagnosis of the condition before you can treat it with anything. We cannot expect everyone to be a dermatologist, but we hope that if he does not know what the lesion is he will ask someone to help him out. That is only natural, you see. We find that quite frequently skin cancers are allowed to exist for months and sometimes years. They are slow-growing and physicians who should really know better will tell their patients that they should leave these lesions alone. Any lesion on the skin, par-

ticularly the face, which begins with a small ulcer, should be looked on with suspicion and an effort made to determine the diagnosis.

In the treatment with various physical methods, x-ray and radium, I want to emphasize that the idea of the treatment is to destroy these cancer cells and that is done by giving a heavy dose. We have gradually increased our base limit of dosage higher and higher as we have had more experience because we have found that more and more of these cases, instead of being basal, were mixed and sometimes were squamous. It is not so easy to tell them apart.

(Numerous illustrations of skin cancers were shown.)

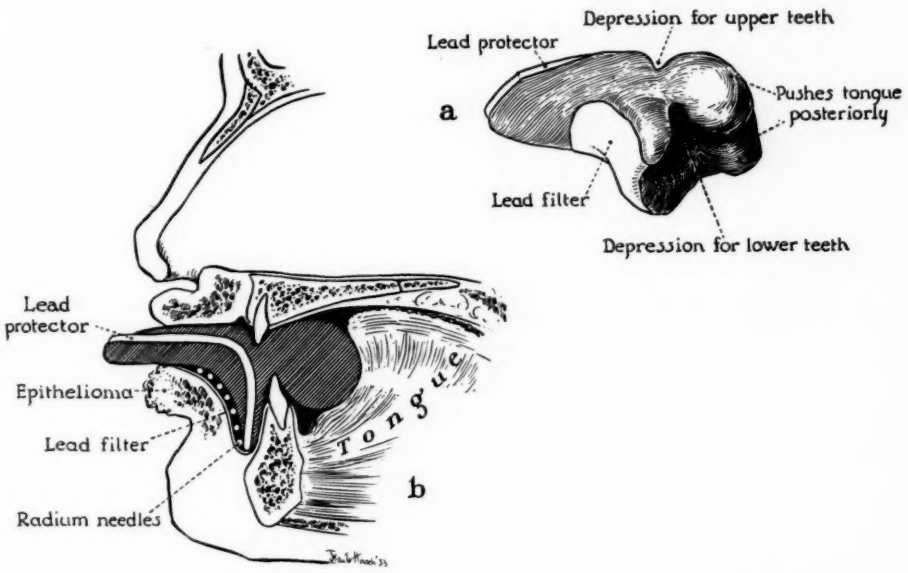
DR. MARTIN NORDLAND: The discussion of cancer of the oral cavity should rightly come at the beginning of this symposium. Dr. Wm. T. Peyton of the Cancer Institute of the University of Minnesota has kindly consented to discuss this subject. I feel he is particularly well qualified to speak on the scope of radium therapy with reference to this subject because of his large experience in this field.

TREATMENT OF CANCER OF THE LIP

DR. WM. T. PEYTON: The primary carcinoma of the lip can always be treated by radiation but a small well circumscribed lesion may be removed by excision. A u-shaped excision is preferable to the usual v-shaped excision. In advanced lesions, diffuse lesions spreading over a considerable part of the lip and recurrent lesions extensively infiltrating the lip, the deformity following adequate surgical removal is prohibitive and unnecessary. Primary lesions of the lip inadequately treated, with persistence or local recurrence of the lesion, are best treated by wide excision.

The technic of radium application for carcinoma of the lip is illustrated in Figure 1. Approximately 100 mg. hrs. is used for each square centimeter of inner surface of lip treated. The area treated is approximately as great as the area excised in surgical removal of a cancer of the lip—approximately 1 cm. on all sides of the visible or palpable edge of the tumor. Kerr dental wax is used to make the mould. Lead filter 0.5 mm. thick is placed on the surface over the radium needles. A lead protector 1 mm. thick is embedded in the wax to protect the roof of the mouth and upper lip. The tongue is pushed back by the wax to diminish the radiation of the tongue by keeping it at a distance from the needles. Since this application is applied to the inner surface of the lip only, the outer surface of the lip is treated by a full erythema dose of x-ray (100 S.E.C. or approximately 1,000 r).

Radium Applicator for Epithelioma of Lip



Immediately after this treatment of the primary lesion prophylactic high voltage x-ray therapy is given to all of the cervical lymph nodes on both sides of the neck and six weeks later the lymph nodes are removed from the submental and submaxillary triangles of each side. It is apparently important but little emphasized in the treatment of cancer of the lip that the removal of the nodes be delayed for some time after the primary lesion has been completely removed or destroyed.

The upper deep cervical nodes are removed together with the submental and submaxillary nodes if any of these two groups of nodes contain demonstrable metastatic carcinoma.

A Crile block dissection on one side is done if any of the deep cervical nodes on that side are involved with metastatic carcinoma.

CANCER OF THE ORAL CAVITY

Cancer of the Tongue.—The primary lesion in cancer of the tongue is best treated by radiation and this is best done by a combination of interstitial radiation and high voltage x-ray therapy.

Interstitial radiation may be in the form of platinum needles containing radium or gold implants containing

radium emanation (radon). The latter are preferable because more easily inserted so as to give a proper distribution of radiation. Whichever form of radium is used it should be placed not in the lesion but under and around the periphery outside of the visible or palpable lesion, approximately in the same plane that one would cut in a conservative surgical exicision of the lesion. In lesions posterior to the anterior third of the tongue, part or all of the radium should be inserted through the skin of the submental region and guided into the proper position by a finger in the mouth, palpating the posterior part of the tongue and floor of the mouth in this region.

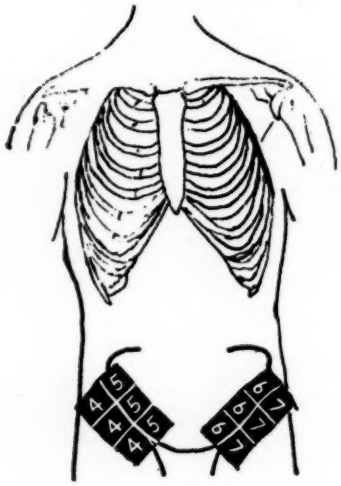


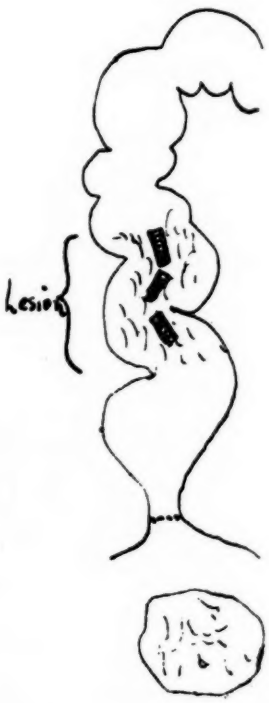
Fig. 1. Case of high rectal carcinoma illustrating application and dosage of radium both to groin and to lesion proper.
Groin (left)—12 areas, 50 mg. each, 14 hours.
Lesion (right)—High—50 mg., 14 hours, 700
Mid—50 mg., 14 hours, 700
Low—50 mg., 14 hours, 700
2100

To determine the dosage take the square of the diameter measured in centimeters and this gives approximately the number of millicuries of radon that should be used.

Prophylactic high voltage x-ray therapy is given to the cervical nodes on each side of the neck. The tongue is included in the fields. A Crile block dissection of the neck is done only if and when the cervical nodes become clinically involved with metastatic cancer, never until a few weeks after complete destruction of the primary lesion.

Carcinoma of the Mucous Membrane of the Oral Cavity Elsewhere Than That of the Tongue.—Interstitial radiation in dosage similar to that used in carcinoma of the tongue and distributed in much the same manner is the method of choice unless bone is involved, when, as a rule, surgical excision is the method of choice. This excision is carried out with surgical diathermy for the soft parts and a chisel to remove the involved bone. The external carotid artery on one side is frequently ligated to diminish bleeding during these excisions. The cervical lymph nodes are sometimes given prophylactic deep x-ray therapy but an invariable rule cannot be made for such prophylactic treatment in these lesions. Decision is made in each case according to the location and malignancy of the lesion.

Treatment of Tumors of the Pharynx.—Squamous cell carcinoma of the pharynx are, as a rule, treated by interstitial radiation and deep x-ray therapy but some of the well localized lesions of lower grades of malignancy may be removed by a lateral pharyngotomy (Trotter operation).



Lympho-epitheliomas are treated by high voltage x-ray therapy in heavy dosage.

DR. MARTIN NORDLAND: The last subject to be discussed with relation to the use of radium therapy is Cancer of the Rectum. This subject is fittingly placed on the program and Dr. Lawrence M. Larson will discuss this phase of the problem.

RADIUM AS AN ADJUNCT TO SURGERY IN THE TREATMENT OF CANCER OF THE RECTUM

DR. LAWRENCE M. LARSON: It is quite generally conceded that the use of radium alone is not justified in the treatment of operable cancer of the rectum but that surgical extirpation remains the method of choice in the eradication of this type of lesion. However, there have been reported a number of cases in which early lesions have been cured by radiotherapeutic methods so that unanimous agreement as to the rôle of radium in the treatment of small rectal neoplasms has not been reached. On the other hand, no one can deny the marked palliation to be derived in the treatment of large inoperable growths, sometimes rendering them operable, but practically always resulting in shrinkage of the lesion, definite decrease in the amount of bleeding and foul discharge, and at least temporary improvement in the general condition of the patient. Between these two extremes are cases in which there is ques-

tion of operability due to extension, fixation, or size of the growth, or to poor general condition of the patient, and in these cases it is entirely possible, by adequate dosages of radium, to convert an inoperable lesion into an operable one, to render a deep lesion a surface one, and in many instances, to offer a much more favorable prognosis for cure than if surgical means alone were employed. It is thus self-evident that success depends upon the closest coöperation between the surgeon, radiologist and patient.

When one considers that one-half to one-third of these patients, as they present themselves, are denied surgical treatment because of contraindications of either a local or general nature, and, further, that of those operated upon not over a third remain cured for five years, this means that radium can be used at sometime or other either on the original lesion, on metastases or on recurrences in about three-fourths of all cases.

There are three types of cases in which radium may be used to advantage.

1. The operable lesion.—In this type of case all possible benefits should be sought from both surgical and radiological methods. This may be accomplished even in small lesions by giving adequate doses of radium six to eight weeks pre-operatively, so that shrinkage of the growth takes place. In some instances of this character, no evidence whatever of neoplastic cells can be made out after resection of the rectum, the bowel being perfectly smooth with only a scar to indicate the previous location of the lesion. In patients whose general condition contraindicates immediate operation although the local lesion is operable, radium is of especial value. This is also true when the patient refuses operation or in conditions in which it is desired to avoid colostomy.

2. Inoperable lesions.—Radium may be used to advantage in many of these cases and in some it has been noted that the lesion actually becomes operable as a result of the treatment. In the others the patient's general condition is improved, and obstruction, bleeding, and pain are definitely lessened. There is no question as to the palliative benefits derived in this type of case. When there is extensive infection of the perirectal tissues radiotherapy is contra-indicated.

3. Recurrences.—In a general way, the same advantages obtain in the treatment of recurrences, although to a lesser degree, frequently because of their inaccessibility. Local or perineal recurrences and occasionally those in regional glands, may be treated with radium alone or in conjunction with surgical means.

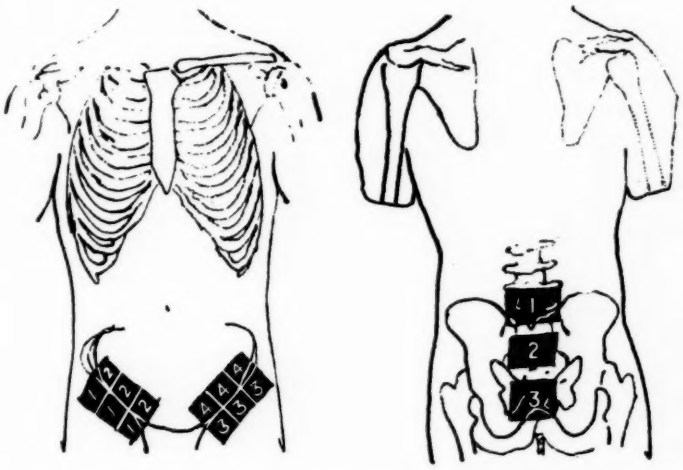


Fig. 2. Typical case of rather large carcinoma low in the rectum. Radiation of the groin as well as of the sacral and perineal areas.
Groin (left)—12 small blocks, 50 mg. each, 14 hours, 700.
Sacrum and perineum (right)—3 large blocks, 3 applications, each 200 mg., 20 hours. Lead 2 mm., wood 5 cm.

The question of whether colostomy should be done preliminary to radiotherapy hinges almost entirely upon the actual presence, or upon the imminence, of obstruction by the lesion. In cases of definite blockage, there is no question as to the advisability of drainage of the bowel and at times it is even an urgent measure. At other times when the lesion gives evidence of impending obstruction such as produced by an annular growth located at the rectosigmoid juncture, or one involving the anal canal, it is a question of judgment whether colostomy is to be done. This must be decided upon the merits of the individual case. It is true that greater accessibility to the lesion may be obtained through the distal stoma of the colostomy, as brought out by some authors, yet the procedure should seldom be done for this reason alone. When extensive infection of the perirectal tissues is present preliminary colostomy is of aid in reducing this, so that it may be possible to use radium later.

Before beginning treatment of rectal neoplasms with radium, several factors must be ascertained. First of all, an exact diagnosis of the lesion must be made, usually by biopsy, not only as to the actual presence of malignancy but also as to the type and grade of neoplasm with which one is dealing. It is well known that the columnar cell or adenocarcinomatous type of growth is more radioresistant than the squamous cell or epitheliomatous variety. Both of these types of growths occur in the rectum, the former originating as a rule above the anorectal juncture and the latter below. The grading of the lesion is highly desirable since tumors of high degree of malignancy (grades 3 and 4) respond most rapidly to radiotherapy and offer the poorest results from surgical therapy, while

the opposite holds true for tumors of low grade (1 and 2). Most neoplasms of the rectum fall in the latter group, in contradistinction to carcinoma of the cervix, in which the preponderance of cases is of high degree of malignancy. Another factor of importance is an appraisal of the general condition of the patient. If this is not satisfactory it should, if possible, be brought to the point where any complications which may arise, such as severe infection, hemorrhage, deleterious systemic effects, and so forth, may be withstood with a reasonable degree of safety.

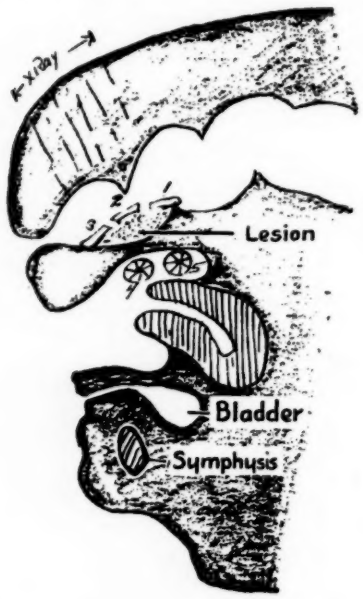


Fig. 3. Carcinoma of the anterior wall of the rectum illustrating method of application of radium both vaginally and directly to the lesion.
Nos. 1, 2 and 3—700 to 300 mg. hours each (70 mg. per sq. cm.—maximum).
Nos. 4 and 5—700 each.
Needling if convenient (1 mg., 48 hours; 1 cm. apart).
Surface packs to inguinal nodes if involved low; not necessary if lesion is as high as rectosigmoid.

The purpose of radium in the treatment of malignancy is to destroy or eradicate the lesion, yet maintain preservation of normal tissue. This is the same purpose attained by surgical methods, and to account for cures by this method one must assume that cancer begins as a local process, an assumption which is an entirely logical one. One must also take into consideration bodily defensive mechanisms, especially the character of the stroma making up the tumor, which may vary in its quality and quantity and thus account for different reactions of similar tumors to the same doses of radium. This difference in stroma may explain the fact that rectal neoplasms, although histologically similar, are generally more radioresistant than lesions of similar structure located in other parts of the body.

In the radiotherapy of rectal neoplasms there are several factors which operate to render treatment difficult and possibly less satisfactory than with lesions elsewhere. These are: (1) a difficulty in approach or accessibility to either the lesion or the regional lymphatics; (2) the frequent radio-resistance of the tumor; and (3) the radio-sensitiveness of the bowel mucosa. The problem is to get a maximum dosage of radium to the treatment field with the least injury to the normal tissues. Since carcinoma of the rectum, as a rule, is relatively benign except in young individuals, this margin of safety is small and accidents may easily occur. It is also true that definite rules for treatment are impossible to lay down, but that the greatest flexibility must be observed since individual cases each present their own problem.

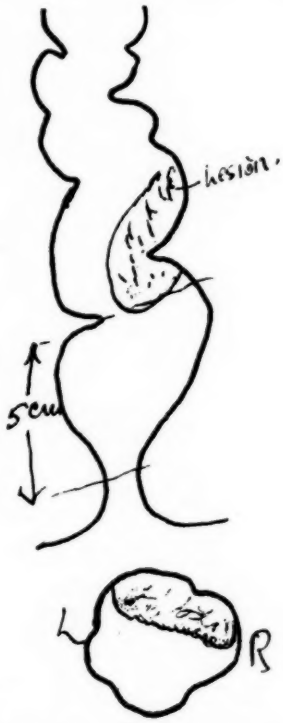


Fig. 4—Lesion of the rectosigmoid area. Radium applied both through vaginal route and by means of needles placed interstitially.
Radium pack—(a) Vaginal transverse—700 against rectum
(b) Vaginal right —700
(c) Vaginal left —700
Lesion—17 needles, 1 cm. apart, 48 hours (1 mg. each).

Two methods are generally used in attacking most cases of cancer of the rectum or rectosigomid—surface radiation and interstitial radiation. To protect normal tissues with either method it is first of all of the greatest importance to pack away, if possible, the opposite wall of the rectum by means of gauze. Since distance is the best protection from radium rays, because the dosage of radiation has been found to be inversely proportional to the square of the distance, one can appreciate the importance of adequate packing. These needles contain usually 1 milligram of radium and are filtered by 0.5 millimeters of platinum. They are placed in the growth 1 centimeter apart and left for 48 hours. The average growth takes from 15 to 20 of these needles, so that 800 to 1,000 milligram hours are utilized in this manner. The position of these needles, 1 centimeter apart, is calculated to destroy the neoplastic tissue in this area but it is a well known fact that malignant growths do not grow in definitely regulated paths, consequently this type of treatment must be supplemented by surface radiation, a method by which the radiation is intended to reach all parts of the tumor.

The latter is done by packing the opposite wall as far away as possible. A radium pack is applied to the lesion, the dosage being so calculated that for every square centimeter of surface of the growth there will be 50 to 70 milligram hours of radium given. This

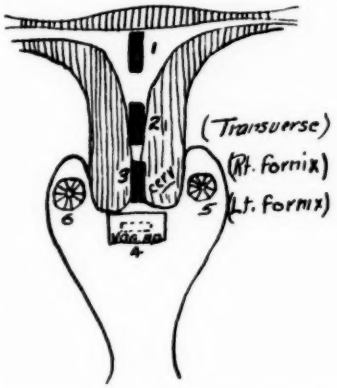


Fig. 5. Carcinoma of the cervix. The same method is used for the large cauliflower growths as for the ulcer types. Only in exceptional cases in which the growth does not melt with this treatment are needles inserted into the growth.

No. 1—1400 1 application
No. 2—1400 2 applications
No. 3—1400 2 applications
No. 4— 700 1 application (vag. type)
No. 5— 700 1 application (vag. type)
No. 6— 700 1 application (vag. type)
Average—6300 mg. hours, divided into 8 applications, giving usually two a week.

The patient is in the hospital over night only.

In making applications in positions 5, 6 and 4, care must be taken to pack the bladder and rectum as far away as possible, using regular gauze packing. Thus, distance is the important factor in getting no involvement of these two organs.

is usually accomplished by means of applicators, each containing 50 milligrams, which are kept in place twelve to fourteen hours. A little reaction on the part of the normal tissues is to be expected but this should never be severe. In low lying lesions, especially those of the anorectal area, it is important to irradiate the inguinal glands on each side and the surrounding lymphatics. This procedure is not necessary for neoplasms high in the rectum or in the rectosigmoid. It is accomplished by the use of six 50 milligram applicators, each covering a square inch of skin surface and left in place about 14 hours. The procedure is repeated on the opposite side, thus giving $6x50x14x2 = 8400$ milligram hours. When it is impossible to completely remove the lesion, such as after posterior resection of the rectum, it is advisable to use radiotherapy immediately postoperative. This may be done by applying packs of radium directly in or over the wound. This consists of three or four 200 milligram applicators or packs placed at a distance of two inches from each other as shown in the diagram.

In summary, it should be repeated that at present it is not justifiable to treat operable neoplasms of the rectum by radium alone since surgical methods offer better results. The treatment with radium has its greatest value when used in conjunction with surgical methods, and in carrying this out it should be emphasized that the closest coöperation should be maintained between the surgeon, radiologist and patient. Radiologic methods are not competing with surgical procedures but are of distinct aid in the palliation and cure of malignant lesions of the rectum.

Respectfully submitted,

F. A. Olson, M.D.,
Secretary-Treasurer.

OBITUARY

Frederick Eugene Vrooman

Frederick Eugene Vrooman, St. Francis, Minnesota; University of Louisville, Louisville, Kentucky, 1902; aged sixty-one; died, June 25, 1934, of cerebral hemorrhage.

Carl J. Holman

1869-1934

Dr. Carl J. Holman, one of the founders of the Mankato Clinic, died at the home of his sister, Mrs. Josephine Belisle, in Minneapolis, May 30, 1934, after an illness of several months. He had recently been a patient at St. Vincent's hospital in Los Angeles, where he underwent a major operation.

Dr. Holman was born October 25, 1869, in Freeborn county. He was the son of Iver J. Holman, who passed away in his ninety-second year two weeks ago, a few hours before Dr. Holman reached Minneapolis from Los Angeles, where he had been practicing for the past five years.

Dr. Holman was a graduate of Rush Medical college and of the Chicago university. He was affiliated with the national, state and county medical societies, and was also an honorary member of the Blue Earth County Society. He held a fellowship in the American College of Surgeons. He was a member of the Minnesota Alumni Association of Alpha Kappa Kappa.

Dr. Holman practiced in Mankato for thirty years. He was a member of the First Presbyterian church in Mankato, and at the time of his death of the Third Presbyterian church of Los Angeles. For a number of years he served on the Minnesota State Board of Medical Examiners under both Governor Burnquist and Governor Eberhart.

Dr. Holman's interest was never far from Minnesota and Mankato in particular. He kept in close touch with Mankato civic affairs not only during his residence there and in this state, but also during the five years of his stay in California.

Surviving are his wife, Dr. Madge T. Holman; one brother, Knute A. Holman of Minneapolis; one sister. Mrs. Josephine Belisle of Minneapolis; four nephews and two nieces.

Mathias Hubert Cremer

1870-1934

Dr. M. H. Cremer, prominent physician and surgeon, chief of the surgical staff of St. John's hospital, Red Wing, died suddenly at his home Saturday afternoon, June 2, 1934, from heart trouble, from which he had been a sufferer for the past year or more. He had made calls and been at his office until noon Saturday, although complaining of heart pains. While at home he was seized with a severe attack while writing a letter, and succumbed at his desk.

Dr. Cremer was one of Red Wing's most prominent citizens and was well known in medical circles. His fame as surgeon was particularly spread through the northwest, from which patients came to St. Johns hospital in large numbers. During the past year or two, ill health narrowed his field of activity but he still headed the surgical staff at St. John's hospital and took active part in the practice of the Medical Block Clinic.

Born at Cashion, Monroe county, Wis., March 12, 1870, he received his early education in the schools of Cashton and La Crosse. He graduated from the medical college of Louisville University, Kentucky, in 1891, returning to Monroe county to practice at Cale-

donia, for nine months. He then entered Rush college, Chicago, to graduate in 1893. For nine years he practiced at Mazeppa, Minn., in partnership with Dr. L. E. Claydon, who is still a member of the firm. In 1901 both came to Red Wing to establish the clinic, which grew to number six doctors and surgeons.

Dr. Cremer was a member of the American Med-City, October 22, 1896, who with the following children, survive: Mrs. L. D. Elliott, Minneapolis; Mrs. F. J. Putzier, Ellsworth; Mrs. I. E. Magee, Ellsworth, and Frances Cremer, Red Wing.

Dr. Cremer was a member of the American Medical Association, the Minnesota State Medical Association, the Southern Minnesota Medical Association and the Goodhue County Medical Society. He was a Mason, an Elk and member of various fraternal bodies. He was surgeon for the C. M. & St. P. and Chicago Great Western railroads. He was one of the founders of St. John's hospital, which he served as head surgeon.

He was an ardent lover of sports and gave enthusiastic and financial support to baseball, basketball, football, bowling, etc. During the days of the old "Minny baseball league" he was president of the Red Wing club. He backed many a Red Wing team in baseball. He was one of the prime movers in securing the construction of the Recreation Alley bowling building here and for many years bowled regularly with one of the leagues.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Books Received for Review

MANUAL OF THE DISEASES OF THE EYE. Charles H. May, M.D. Director and Attending Surgeon, Eye Service, Bellevue Hospital, New York, etc. 496 pages. Illus. Price, cloth, $4.00. Baltimore, Md.: William Wood & Co., 1934.

THAT HEART OF YOURS. S. Calvin Smith, M.D., Sc.D. 212 pages. Illus. Price, cloth, $2.00. Philadelphia: J. B. Lippincott Co., 1934.

THE CARE AND FEEDING OF CHILDREN. L. Emmett Holt, Jr., M.D., Associate Pediatrician to the Johns Hopkins Hospital, Baltimore, Maryland. Fifteenth Revised Edition. 259 pages. Illus. Price, cloth, $1.25. New York: D. Appleton-Century Co., 1934.

A TEXTBOOK OF BACTERIOLOGY. Hans Zinsser, M.D., Professor of Bacteriology and Immunology, Harvard University Medical School, etc., and Stanhope Bayne-Jones, M.D., Professor of Bacteriology, Yale University Medical School, etc. Seventh Edition. 1,226 pages. Ills. Price, cloth, $8.00. New York: D. Appleton-Century Co., 1934.

POSTURES AND PRACTICES DURING LABOR AMONG PRIMITIVE PEOPLES. Julius Jarcho, M.D., F.A.C.S., of New York. 175 pages. Illus. Price, cloth, $3.50. New York: Paul B. Hoeber, Inc., 1934.

ALPHA-DINITROPHENOL—A METABOLIC STIMULANT

A year has elapsed since alpha-dinitrophenol was introduced into therapeutics as a metabolic stimulant by Tainter and his collaborators of the Stanford University. Considering the potency of the drug, few untoward results or accidents have been reported. The only definite side-action from the therapeutic use of the drug is a skin rash, which occurs in about one out of every fifteen cases. The rash is uncomfortable for a few days and then disappears without sequelæ. There have been no deleterious effects observed so far on the kidneys, but rather the contrary. Likewise the liver appears not to be damaged. The introduction of dinitrophenol into therapeutics has aroused widespread interest in metabolic stimulants in general, and in substitutes for this drug, in particular. Already certain British workers are proceeding to test the therapeutic actions of a related cresol. No information is at hand on the frequency of undesirable effects from this cresol, nor is its clinical toxicity or efficiency established. Therefore the dinitrocresol is still in the experimental stage and not ready for general therapeutic use. In contrast, the past year's experience with dinitrophenol has shown it apparently to be a relatively safe and reliable metabolic stimulant with which the practitioner may obtain therapeutic results. This does not mean that dinitrophenol should be given to every obese patient. In those cases in which diet has failed and thyroid is either not needed or not tolerated, dinitrophenol may be used with good prospects of benefit. However, this agent must be used only under carefully controlled conditions and with due regard for the possibility that more extensive use may bring to light as yet unsuspected toxic effect. (*Jour. A. M. A.*, February 17, 1934, p. 542.)

VINYL ETHER

The Council on Pharmacy and Chemistry reports that vinyl ether (divinyl ether, divinyl oxide) is a preparation of Merck & Company, Inc., originally proposed by Leake and Chen for use in inhalation anesthesia in place of ethyl ether. Vinyl ether, as prepared for anesthesia, is said to contain 0.01 per cent phenylalphanaphthylamine to prevent polymerization and decomposition, and 3.5 per cent absolute ethyl alcohol to prevent freezing on evaporation. This product is not yet marketed for general use and is prepared at present only for investigative work. The advantages claimed for vinyl ether over ethyl ether are that it is less irritating to mucous membrane; that induction of anesthesia is much more rapid and recovery more prompt; that it has a somewhat higher partition coefficient than ethyl ether; that the minimum anesthetic concentration is much lower; that the minimum blood concentration of vinyl ether necessary for anesthesia is about one-fourth that of ethyl ether; that vinyl ether offers a greater margin of safety. In the clinical trials induction was said to be exceedingly rapid and recovery correspondingly prompt, the latter occurring frequently in from thirty seconds to one minute. Satisfactory surgical relaxation is stated to obtain and anesthesia has been maintained for varying periods up to nearly three hours. The Council decided to defer further consideration of vinyl ether for anesthesia pending accumulation of additional evidence as to the therapeutic usefulness of this product and until the manufacturer markets vinyl ether for general use; at that time the preparation will also be examined by the A. M. A. Chemical Laboratory. (*Jour. A. M. A.*, January 6, 1934, p. 44.)